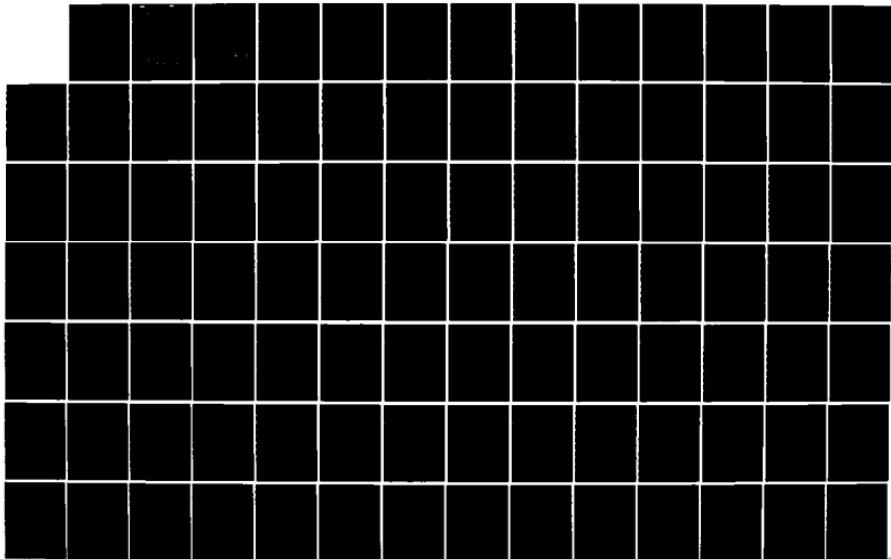
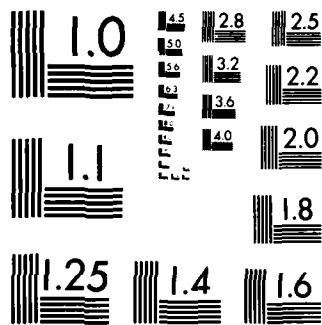


AD-A154 982 LAROSE TO GOLDEN MEADOW LOUISIANA HURRICANE PROTECTION 1/2
PROJECT FINAL SUPP. (U) ARMY ENGINEER DISTRICT NEW
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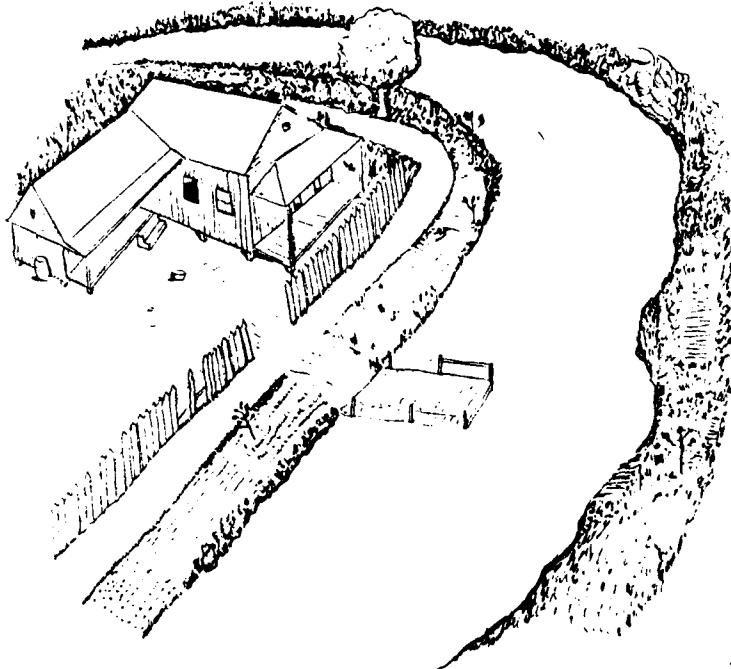


US Army Corps
of Engineers

New Orleans District

NOVEMBER 1984

AD-A 154 982
**FINAL
SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT**



FILE COPY

**LAROSE TO
GOLDEN MEADOW**
LOUISIANA

HURRICANE PROTECTION PROJECT

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
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		6. PERFORMING ORG. REPORT NUMBER
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19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Environmental Impacts Marsh Golden Meadow Mitigation Lafourche Parish Wetlands Larose		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report assesses the impacts of the inclusion of two agricultural tracts, the exclusion of a marsh area, and the realignment of a floodwall in conjunction with the Larose to Golden Meadow, Louisiana, hurricane protection project. The project is located in Lafourche Parish, Louisiana. Wetland losses associated with the project were also reevaluated. The project provides for a hurricane protection levee from Larose to Golden Meadow. The levee would extend about 21 miles on the west bank and 22 miles on the east bank of Bayou		

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Lafourche. The complete system would have a net elevation of +13.0 feet NGVD at Golden Meadow to +9.5 feet at Larose.

AII



Unclassified

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

LAROSE TO GOLDEN MEADOW LOUISIANA

LAFOURCHE PARISH

ABSTRACT

ABSTRACT: In the early 1960's, local interests completed a 36-mile long ring levee from Larose, Louisiana, to the vicinity of Golden Meadow, Louisiana. The levees extended approximately 40 arpents (1.5 miles) from Bayou Lafourche on both the east and west sides. In 1965, Congress authorized the raising of this levee to a height to prevent hurricane tidal damages, two floodgates for navigation in Bayou Lafourche, and seven multi-barrelled culverts for interior drainage. In 1972, the Corps of Engineers prepared a General Design Memorandum (GDM) to describe the project. At the request of local interests, pumping stations replaced culverts in the GDM. The difference between the costs of the pumping stations and culverts would be borne entirely by local interests. In 1974, a Final Environmental Impact Statement (EIS) was filed with the Council on Environmental Quality. In 1975, construction on the levees commenced, and, at the present time (November 1984), all first levee lifts are complete on the west side except at the extreme northern end. Construction on the Golden Meadow floodgate started in July 1982, construction on Section A East commenced in October 1982, and construction on the Larose floodgate commenced in June 1983. During the process of complying with Section 406 of the 1972 Federal Water Pollution Control Act, two Federal agencies objected to the portion of the levee alignment that impacted 2,700 acres of marsh and pond southeast of Golden Meadow. Subsequently, the Corps agreed to revise the levee alignment so as to impact 1,217 acres and to develop a plan to mitigate for wetland losses. Meanwhile, closer study of the area indicated several hundred acres of wetlands to be impacted that were not analyzed in the 1974 Final EIS. During the late 1970's, local interests requested that two previously leveed agricultural areas be included in the levee alignment. A GDM has been prepared for such work. Because of these changes in the project since the filing of the Final EIS, this EIS supplement has been prepared. Five structural plans and the no-action plan are considered in detail. The plans basically follow a slightly modified GDM alignment with various changes to either incorporate designated tracts of agricultural lands or avoid sensitive wetland areas. Plan I consists of the modified GDM

alignment, plus inclusion of the Clovelly Farms and Louisiana Land and Exploration property. Plan I has been designated as the National Economic Development Plan and also the Recommended Plan (RP) based on total net benefits, cost, and, meeting to the extent practicable, the planning objectives. Plan S, similar to Plan I, but realigned to avoid inclosure of marsh, has been designated as the Least Environmentally Damaging Plan. This designation is based on the realignment in Section E South which would avoid a sizeable area of sensitive wetland habitat. Implementation of the RP would result in the conversion of 1,454 acres of wetlands and shallow water to levee and deep borrow pits. In addition, 3,144 acres of similar habitat would be inclosed by the levee system and, subsequently, undergo induced drainage and clearing. To compensate for these losses, a mitigation plan was formulated to protect marsh habitat in the Pointe au Chien Wildlife Management Area from further degradation due to saltwater intrusion. Because some of the mitigation work proposed by the Corps was accomplished by the State of Louisiana, a revision of the mitigation plan is necessary, and this plan will be released as a separate document.

APR 1 1985

Date: _____

Send your comments to the District Engineer by the date stamped above. If you would like further information on this document, please contact Mr. E. Scott Clark, US Army Engineer District, P.O. Box 60267, New Orleans, LA 70160-0267. Commercial telephone: (504) 838-2518.

NOTE: Information, displays, maps, etc., displayed in the appendices are incorporated by reference into this EIS.

**LEAD AGENCY. U.S. ARMY CORPS OF ENGINEERS DISTRICT
NEW ORLEANS, LOUISIANA**

SUMMARY

INTRODUCTION

S-1. The study area lies in southeastern Louisiana (see Plate 1). In the early 1960's, local interests in Lafourche Parish completed a low ring levee with low-lift pumps to drain the area. The levee originated in the town of Golden Meadow on the west bank of Bayou Lafourche and extended north to the town of Larose along the 40-arpent line - a line parallel to Bayou Lafourche out about 1.5 miles from the bayou. On the east side of the bayou, it followed the 40-arpent line south and ended at Yankee Canal. In 1965, Congress authorized: 1) raising the height of this low levee to provide hurricane protection, 2) constructing two navigable floodgates in Bayou Lafourche, and 3) placing seven multi-barrelled culverts for interior drainage. In 1972, the Corps of Engineers completed a General Design Memorandum (GDM) describing such a project (see Plate 2). At the request of local interests, pumping stations replaced culverts in the GDM. The differences in costs between the pumping stations and culverts will be a local responsibility. The GDM also extended the levee approximately 2 miles south of Golden Meadow to incorporate development on the west side of the bayou. In 1974, a Final Environmental Impact Statement (EIS) was filed with the Council on Environmental Quality. In December 1974, during the process of achieving compliance with Section 404 of the Federal Water Pollution Control Act (FWPCA), the US Fish and Wildlife Service (USFWS), and the National Marine Fisheries Service (NMFS) made five recommendations. The most significant change involved the realinement of Section A East, the section southeast of Golden Meadow. As described in the Final EIS, approximately 2,700 acres of wetlands would be impacted in Section A East alone. In partial compliance with their recommendations, the alignment in Section A East was changed to impact about 2,000 acres of such habitat. The Environmental Protection Agency (EPA) then approved the Corps' plan on the condition that an acceptable mitigation plan be

developed. Subsequently, the Corps moved the levee alignment farther west so that construction of Section A East would impact a total of 1,217 acres of marsh/pond. In the 1970's, the South Lafourche Levee District requested the enclosure of two additional tracts of agricultural land within the levee alignment not previously discussed in the 1974 Final EIS. Further investigations revealed that approximately 2,079 more acres of wetlands would be impacted within the original GDM alignment than were analyzed in the 1974 Final EIS. Also, plans were carried out to develop a mitigation plan.

S-2. In view of the above facts, this supplement to the 1974 Final EIS has been prepared.

S-3. Because first lifts on most levee sections on the western side of Bayou Lafourche have been completed, no new alternatives were developed on the western side. However, the impacts of the one levee section not begun on the west (Section C North) and the impacts on the marsh in Section C South (completed) are considered in this supplement. In addition, the first lift on Section A East which is located on the eastern side of Bayou Lafourche at the southern most end of the project has been completed.

S-4. Five levee alignments along the eastern side of the bayou are studied in detail in this supplement. The no-action alternative is considered, but is not a feasible option.

MAJOR CONCLUSIONS AND FINDINGS

S-5. Plan 1 has been designated as the National Economic Development (NED) Plan and the Recommended Plan (RP) because it would generate the maximum net benefits as shown in Table 3 on page EIS-26. It would provide protection from hurricane flooding to the largest practicable area, and is the plan most acceptable to local interests. It would

cause the greatest fish and wildlife losses of any plan, but a mitigation plan would compensate for these losses.

S-6. Plan 5 has been designated as the Least Environmentally Damaging (LED) Plan because it would involve the least habitat loss of any plan. It would exclude approximately 1,300 acres of wetlands and open water from the levee system by modifying the levee alignment in Section E South. However, this realignment would not follow the existing low levee as the RP alignment does, and therefore would consist of 6.5 miles of new levee construction as opposed to levee raising along 4 miles of existing low levee. The increased length of the levee and new levee work associated with the LED Plan would cost \$4.3 million more than the RP. Thus, the incremental cost of avoiding the wetland area is economically unjustifiable. The proposed mitigation plan would compensate for the wetland habitat loss associated with not selecting Plan 5, plus the loss of another 3,100 acres of fish and wildlife habitat at a cost of about \$2.25 million.

S-7. Based on information contained in Appendix A, Section A.2, the RP would not jeopardize the existence of any endangered and/or threatened species or critical habitat.

S-8. Executive Order 11990 states that Federal agencies should not alter wetlands unless there is no practicable alternative. All alternatives (except the no-action) would cause some wetland destruction, either through direct construction impacts or subsequent induced drainage. These impacts are discussed in more detail in the Environmental Effects section of this Final Supplemental Environmental Impact Statement (FSEIS). The RP would impact the most wetlands while the LED plan would exclude a large wetland area that would be impacted by all other structural plans. However, as described in paragraph S-6 above, the RP is the most practicable plan.

S-9. The proposed action would involve completion of a hurricane protection levee in a floodplain. Alternate alignments have been identified and are discussed in the Alternatives section of this supplement. Other than the no-action alternative, no non-floodplain alternatives are practical. The Environmental Effects section describes the beneficial and adverse impacts of each alternative. Initial views of the public were obtained at a public hearing in 1956. Since then, numerous informal meetings with the South Lafourche Levee District, USFWS, NMFS, and Louisiana Department of Wildlife and Fisheries (LDWF) have been held to fully coordinate this study with all interested parties.

S-10. A Public Notice was published on 1 November 1974 to comply with Section 404 of the FWPCA; and on 20 December 1974, a Statement of Finding (SOF) was issued. The USFWS and NMFS recommended five project modifications. One recommendation suggested obtaining borrow on the protected side of the levee. The second recommendation suggested placement of the Golden Meadow floodgate borrow stockpile inside the levee. Another recommendation stressed that the culverts in the project levees should remain open at all times except when excessive high water exists or is forecast. The Corps agreed with the first two recommendations. However, the third recommendation cannot be implemented because pumping stations, rather than culverts, are now part of the plan. The final two recommendations suggested levee realinement in Section C South and A East. Both of the suggested realinements would exclude wetlands from inclosure within the levee system. The Corps decided that realinement in Section C South was not feasible due to prohibitive costs. The alignment in Section A East was modified to exclude 1,500 acres of wetlands and ponds, though not the entire 2,700 acres that the other agencies requested. The Corps of Engineers moved the alignment as near Bayou Lafourche as engineeringly feasible. The presence of a producing oil field, several pipelines, and other facilities made it infeasible to move the alignment nearer the bayou.

In a Supplemental Statement of Findings (2 November 1976), the Corps formally responded to these recommendations.

S-11. EPA Guidelines published in December 1980 specified that all deposition of dredged or fill material that occurred after 1 October 1981 must comply with said guidelines. A Section 404 (b)(1) Evaluation was signed by the District Engineer on 18 November 1982, a Public Notice and the Section 404 (b)(1) Evaluation were distributed in March 1983. A State Water Quality certification was obtained 12 June 1983 (Appendix A, Sections A.5 and A.10). This evaluation concluded that the only violation of applicable state water quality standards for work not yet completed would be temporary turbidity during first lift construction; that the proposed action would not result in significant adverse effects on human health and welfare; and that appropriate and practicable steps would be taken, when possible, to minimize potential adverse impacts on the aquatic ecosystem. A Section 404 (b)(1) Evaluation will be prepared, a Public Notice distributed, and application made for a State Water Quality certification to assess the impacts of mitigation.

S-12. A Consistency Determination with the Louisiana Coastal Resources Program (LCRP) was prepared for remaining work. These project features, except Clovelly Farms, LL&E, and the mitigation plan, were approved for construction prior to inception of the LCRP in 1980 and are, therefore, exempt from consistency. The Corps has determined the Clovelly Farms, LLSE, and mitigation work is consistent to the maximum extent practicable, and once the mitigation plan has been fully coordinated with the LCRP, full compliance is expected.

AREAS OF RESOLVED CONTROVERSY

S-13. The leveeing of wetlands caused concern to the USFWS, NMFS, and LDWF. The alignment in Section A East was changed to drastically reduce

the amount of wetlands inclosed, and a plan to mitigate unavoidable wetland losses is being prepared and would be coordinated with the USFWS and LDWF. The South Lafourche Levee District adopted the concept of a mitigation plan and agreed on a 70/30 cost sharing basis.

UNRESOLVED ISSUES

S-14. There are no unresolved issues at this time. Concern has been expressed by the National Marine Fisheries Service that a mitigation plan may not compensate for estuarine finfish and shellfish losses.

RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION STATUTES OR OTHER ENVIRONMENTAL REQUIREMENTS

S-15. Table 1 shows the current status of compliance with each of the Federal, state, and local statutes or other environmental requirements. A plan is listed as being in full compliance if, at this stage of project planning, all necessary steps have been taken to comply with the statute in question.

TABLE 1

RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION
STATUTES OR OTHER ENVIRONMENTAL REQUIREMENTS

	PLANS				
	1	2	3	4	5
<u>FEDERAL STATUTES</u>					
Preservation of Historical Archeological Data Act of 1974.	FC	FC	FC	FC	FC
Clean Air Act, as Amended.	FC	FC	FC	FC	FC
Clean Water Act of 1977.	FC	FC	FC	FC	FC
Coastal Zone Management Act of 1972, as Amended. ^{1/}	PC	PC	PC	PC	PC
Endangered Species Act of 1973, as Amended.	FC	FC	FC	FC	FC
Estuary Protection Act.	FC	FC	FC	FC	FC
Farmland Protection Act	N/A	N/A	N/A	NA/	N/A
Federal Water Project Recreation Act.	FC	FC	FC	FC	FC
Fish and Wildlife Coordination Act. ^{2/}	PC	PC	PC	PC	PC
Land and Water Conservation Fund Act.	N/A	N/A	N/A	N/A	N/A
Marine Protection Research and Sanctuaries Act of 1972, as Amended.	N/A	N/A	N/A	N/A	N/A
National Historic Preservation Act.	FC	FC	FC	FC	FC
National Environmental Policy Act. ^{3/}	PC	PC	PC	PC	PC
River and Harbor Act.	FC	FC	FC	FC	FC
Watershed Protection and Flood Prevention Act.	N/A	N/A	N/A	N/A	N/A
Wild and Scenic Rivers Act.	FC	FC	FC	FC	FC
<u>EXECUTIVE ORDERS</u>					
Executive Order 11988, Floodplain Management.	FC	FC	FC	FC	FC
Executive Order 11990, Protection of Wetlands.	FC	FC	FC	FC	FC
Executive Order 12114, Environmental Effects Abroad of Major Federal Action.	N/A	N/A	N/A	N/A	N/A

TABLE 1 (CONTINUED)

**RELATIONSHIP OF PLANS TO ENVIRONMENTAL PROTECTION
STATUTES OR OTHER ENVIRONMENTAL REQUIREMENTS**

	PLANS				
	1	2	3	4	5
Executive Memorandum, Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA.	FC	FC	FC	FC	FC
Executive Order 11593, Protection and Enhancement of the Cultural Environment.	FC	FC	FC	FC	FC
Executive Order 12372, Intergovernmental Review of Federal Programs.	FC	FC	FC	FC	FC
STATE AND LOCAL POLICIES					
Air Control Law.	FC	FC	FC	FC	FC
Archaeological Treasure Act.	N/A	N/A	N/A	N/A	N/A
Historic Preservation District Act.	N/A	N/A	N/A	N/A	N/A
Louisiana Scenic Streams Act.	N/A	N/A	N/A	N/A	N/A
Protection of Cypress Trees (EO 1980-3).	FC	FC	FC	FC	FC
Water Control Law.	FC	FC	FC	FC	FC
LAND USE PLAN					
Louisiana Coastal Zone Management Plan. ^{1/}	PC	PC	PC	PC	PC
REQUIRED FEDERAL ENTITLEMENTS					
None are required.					

= Full compliance . PC = Partial compliance. N/A = Not applicable.

Project features approved prior to inception of the Louisiana Coastal Resources Program are exempt from consistency. Although exempt, these features are consistent. The newly approved features have also been determined by NOD to be consistent. Full compliance is expected once the mitigation plan is completed and approved.

Full compliance will be achieved when a mitigation report is finalized.

Upon completion of the EIS review process, and signing of a Record of Decision, full compliance will be achieved.

TABLE 1
COMPARATIVE IMPACTS OF ALTERNATIVESTABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES

ALTERNATIVES

SIGNIFICANT RESOURCE
MARBLES

ALTERNATIVE	SIGNIFICANT RESOURCES	SIGNIFICANT RESOURCES
EXISTING CONDITIONS: CLOVELLY FARMS	1,093 acres F/I and 4.5 acres B in SA; 1,093 acres F/I attributable to Clovelly Farms and 5.4 acres B attributable to L&E, in SA;	Impact: Over the project life, an annualized 298 acres of F/I and 6.85 acres B present in SA
Plan 1 (FW) Available 2096:	211 acres F/I and 3.33 acres B in SA. 2.1 acres F/I and 30 acres B attributable to Clovelly Farm and L&E.	Impact: No marsh remaining in SA by 2096.
Plan 1 (FW) Available 2096:	370 acres F/I and 291 acres B lost due to direct construction in SA. 723 acres F/I and 55.4 acres B lost due to indirect impact in SA. 110 acres F/I lost due to direct and indirect impacts attributable to inclusion of Clovelly Farms.	Impact: 370 acres F/I and 237 acres B lost due to direct construction in SA. 723 acres F/I and 55.4 acres B lost due to indirect impact in SA.
Plan 1 (FW) Available 2096:	54 acres B lost due to direct and indirect impacts attributable to inclusion of L&E.	Impact: 54 acres B lost due to direct and indirect impacts attributable to inclusion of L&E.
Plan 1 (FW) Available 2096:	An annualized 83 acres of F/I and 78 acres of B for a net annualized loss of 215 acres and 6.07 acres, respectively.	An annualized 102 acres of F/I and 132 acres of B present over the project life, and a net annualized loss of 196 and 553 acres, respectively.
Plan 2 (FW) Available 2096:	10 acres B remaining by 2096 due to exclusion L&E.	Impact: 370 acres F/I and 237 acres B lost due to direct construction in SA. 723 acres F/I and 55.4 acres B lost to indirect impacts in SA. 110 acres F/I lost due to direct and indirect impacts attributable to inclusion of Clovelly Farms.
Plan 3 (FW) Available 2096:	13 acres F/I and 6.8 acres B remaining by 2096 due to exclusion of Clovelly Farms.	Impact: 311 acres F/I and 291 acres B lost due to direct impacts in SA. 672 acres F/I and 334 acres B lost due to indirect impacts in SA. 54 acres B lost due to direct and indirect impacts attributable to inclusion of L&E.
Plan 4 (FW) Available 2096:	2 acres F/I and 30 acres B remaining by 2096 due to exclusion of Clovelly Farm and L&E.	Impact: 311 acres F/I and 237 acres B lost due to direct impact in SA. 672 acres F/I and 334 acres B lost due to indirect impact in SA.
Plan 5 (FW) Available 2096:	137 acres F/I and 554 acres B lost to indirect impact in SA. Marsh acreage lost due to inclusion of both farms same as Plan 1. Levee realignment in Section E South preserved 681 acres F/I in this plan.	Impact: An annualized 102 acres of F/I and 132 acres of B present over the project life, and a net annualized loss of 196 and 553 acres, respectively.
Plan 6 (FW) Available 2096:	An annualized 210 acres of F/I and 169 acres of B present over the project life, and a net annualized loss of 88 and 516 acres, respectively.	Impact: An annualized 210 acres of F/I and 169 acres of B present over the project life, and a net annualized loss of 88 and 516 acres, respectively.

project life starting upon the completion of the hurricane protection levee (1996).

29. Table 3 compares existing conditions, future without project conditions, and impacts of each plan. The following are abbreviations used in Table 3:

o Study Area	SA
o Future With Project	FW
o Future Without Project	FWO
o Fresh and Intermediate Marsh	F/I
o Brackish Marsh	B
o Bottomland Hardwoods	BLHW
o Wooded Swamp	WS
o Dissolved Oxygen	DO
o Louisiana Land and Exploration Company	LL&E

habitat value which would result from implementation of the hurricane protection levee.

25. On June 6, 1984, the Corps of Engineers was notified that two of the three weirs evaluated in the Draft Mitigation Report had been constructed. Because this was just prior to release of the Draft Supplemental Environmental Impact Statement (DEIS) to the public, a decision was made to issue the document as originally designed with the knowledge that the mitigation plan would no longer fully compensate for project-induced losses. This because the benefits associated with the weirs can no longer be claimed.

26. To expedite public release of the Final Supplemental EIS, a separate Mitigation Report will be prepared. Modifications to the mitigation plan discussed in the DEIS will be made in cooperation with LDWF and USFWS to insure that mitigation does fully compensate for project losses.

COMPARATIVE IMPACTS OF ALTERNATIVES

27. The study area (10,362 acres) includes acreage along the levee right-of-way, all acreage inclosed by the proposed levees around Clovelly Farms and the LL&E property, and any wetlands inclosed by the levee alignment.

28. The significant resources identified in the study and mitigation areas are addressed in the Affected Environment section of this DSEIS, and impacts of each plan on each significant resource are detailed in the Environmental Effects section. Acreage data presented in the Environmental Effects section are based on acreages present in 1975. Future with and without project conditions are based on a 100-year

TABLE 2

IMPLEMENTATION RESPONSIBILITIES

ITEM	ALTERNATIVE PLANS				
	1	2	3	4	5
	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)	(\$1,000)
FIRST COST					
Federal	29,824	29,009	29,293	28,478	33,030
Non Federal	<u>12,781</u>	<u>12,432</u>	<u>12,554</u>	<u>12,205</u>	<u>14,155</u>
TOTAL	42,605	41,441	41,847	40,683	47,185
ANNUAL COST					
Federal	1,005	977	988	960	1,114
Non Federal	<u>741</u>	<u>726</u>	<u>723</u>	<u>708</u>	<u>787</u>
TOTAL	1,746	1,703	1,711	1,668	1,901

NOTE: Included in the costs of all plans are the remaining costs to complete the authorized project. All costs are stated in October 1983 prices and annual costs were computed using an interest rate of 3 1/4 percent. All annual operation and maintenance cost would be borne by non-Federal interests.

Plan 1 and an alinement change in Section E South to exclude 681 acres of marsh from inclosure within the levee system (see Plate 7). The levee in Section E South would be built to a height of between +8.5 to +10.5 feet NGVD and would be approximately 6.5 miles in length compared to 4 miles in length for the modified GDM alinement. The borrow material would be taken from the protected side of the levee. This is the Least Environmentally Damaging (LED) Plan.

IMPLEMENTATION RESPONSIBILITES

23. Implementation responsibilities for the detailed plans are summarized in Table 2. The Federal Government would pay 70 percent of the first costs and non-Federal interests would be responsible for the remaining 30 percent. All annual operation and maintenance costs would be borne by non-Federal interests.

MITIGATION

24. In cooperation with the Louisiana Department of Wildlife and Fisheries (LDWF) and the U. S. Fish and Wildlife Service (USFWS), the Army Corps of Engineers is developing a plan to mitigate for project-associated wetland losses to be incurred by the construction of the hurricane protection levee. The implementation of a mitigation plan on the state-owned Pointe au Chien Wildlife Management Area (WMA) is being evaluated. The Pointe au Chien WMA, as is the case with most coastal Louisiana wetlands, is deteriorating rapidly from saltwater intrusion and subsidence and is badly in need of a water management program retard the rapid loss of wetland. Mitigation could maintain the habitat value of the area to fish and wildlife resources above that which would be expected in the future if no management program were implemented. The benefit in increased habitat value could be used to offset the loss in

and recreational fishing and hunting access to the marsh areas east of the authorized GDM levee alignment. Structural features of this plan, as well as all other plans, include the development of launch areas at Yankee Canal, Bully Camp Canal, and one as yet unknown location near the town of Golden Meadow to restore fishing and hunting access. A minor realinement would occur at the southern end of Section E South. This is the Recommended Plan (RP) and National Economic Development Plan (NED).

19. Plan 2 - Modified GDM alignment plus Clovelly Farms. This alternative would consist of the modified GDM alignment, with an alignment change in Section E North to include Clovelly Farms as described above (see Plate 4).

20. Plan 3 - Modified GDM alignment plus LL&E property. This plan would consist of the modified GDM alignment, with an alignment change in Section D to include LL&E property as described in paragraph 18 (see Plate 5).

21. Plan 4 - Modified GDM alignment. This plan would consist of the original GDM alignment as described in paragraph 7. Modifications made as a result of the Section 404 Evaluation process (described in paragraph S-10) include: borrow material obtained from the protected side of the levee, the Golden Meadow floodgate stockpile placed inside the levee, and the levee realinement in Section A East excluding 1,500 acres of wetlands and ponds originally included in the GDM alignment. Another major modification would be the realinement of the floodwalls to include a number of residential and commercial buildings located adjacent to the Gulf Intracoastal Waterway in Larose, Louisiana (see Plate 6). A minor realinement would occur at the southern end of Section E South.

22. Plan 5 - Modified GDM alignment plus Clovelly Farms, LL&E property, and Section E South alternate. This plan would include the modified GDM

17. Cultural resources of the study area are presently being impacted by the processes of erosion, wave wash, subsidence, and urbanization of the area. These impacts are significant and are destroying archeological and historical resources located in the marshes, along the waterways, and in the areas of planned urban development. In the future, the destructive forces of nature and urban expansion will continue to adversely impact cultural resources in the study area.

PLANS CONSIDERED IN DETAIL IN THIS DOCUMENT

This supplemental EIS considers five structural plans which are described below.

18. Plan 1 - Modified GDM alinement plus Clovelly Farms & Louisiana Land and Exploration Company (LL&E) property. This plan includes the modified GDM alinement described in paragraph 21 below and also includes Clovelly Farms and the LL&E property (see Plate 3). Presently, Clovelly Farms (2,437 acres agricultural; 31 acres low levee) is protected by a levee with an elevation of +6.0 feet NGVD. The new elevation would be between +8.5 and +8.9 feet NGVD with a total length of 29,145 feet. The LL&E property (3,270 acres agricultural; 26 acres low levee) has been protected since 1967 by a levee with an elevation of +7.0 feet NGVD. The elevation of the new levee would vary from +11.2 to +13.0 feet NGVD, with a total length of 32,400 feet. At present, LL&E is drained by a small capacity (200 cfs) pumping station. This station would remain with a new floodwall to protect it. Drainage structure No. 5 would be relocated to the northern GDM-LL&E alinement intersection (see Plate 2). Borrow material required for construction would be taken from the protected side of the levee along the modified GDM alinement sections and on the floodside for the two farm alinement sections. Construction of the levee also would eliminate the launch areas at Larose, Golden Meadow, Breton Canal, and Clovelly Farms, thereby preventing commercial

hardwood forests, 60 are wooded swamp, and 100 are fresh marsh. Therefore, considering the habitat loss, this alternative was not considered feasible.

14. Change in Section D. This alternative was proposed by the local assuring agency in early 1978. The request proposed included a large tract of privately owned land. Since 1974, the Corps of Engineers has reviewed realinements in Section D a number of times. In February 1982, the extensive costs of such realinements were furnished to the Levee District; no further action has been taken by the Levee District.

WITHOUT PROJECT CONDITIONS (NO ACTION ALTERNATIVE)

15. If no Federal action were taken to address the planning objectives, residents within the study area would continue to be subject to flooding due to tidal surges from hurricane storm events. Local interests have constructed low-level levees to protect residents and property from normal storm events which affect the Louisiana coastal parishes on the average of twice every three years; but these levees are not sufficient to guard against hurricane-class storms.

16. Fish and wildlife resources would drastically diminish as marsh and forestlands are drained; cleared for agricultural, industrial or residential uses; or converted to open water due to land subsidence and saltwater intrusion. In 1975, there were 2,960 acres of wetlands and forests and 1,638 acres of open water in the study area. By 2096, there would be only 540 acres of wetlands remaining; open water would have increased to 3,202 acres, pasture to 720 acres, and residential/industrial to 137 acres. The anticipated decrease in fish and wildlife productivity throughout the study area would cause a reduction of outdoor recreational potential. With or without project, wildlife and fishery habitat would drastically be reduced by 2096; however, habitat loss would occur sooner with the project.

levees. Also, it would be more difficult to obtain assurances for rights-of-way which divide property tracts inside and outside the levee.

10. Nonstructural Measures. Such measures as more accurate weather forecasting and more effective flood warning would have augmented all of the alternatives.

11. No-Action. This alternative would have caused no loss of fish and wildlife resources, no destruction of cultural resources, and no further decline in water quality; but it would not have achieved the objective of flood protection.

PLANS REQUESTED FOR CONSIDERATION AFTER THE 1974 FINAL EIS AND SUBSEQUENTLY ELIMINATED FROM FURTHER STUDY

12. Since completion of the Final EIS, the local assuring agency, on behalf of landowners who wished to have their property included within the levee system, has submitted two modifications to the GDM alinement for review. General locations are shown on Plate 3.

13. Change in Section C North. This alternative proposed to move the GDM levee alinement in Section C North to the west so as to incorporate the property of two landowners. Although the matter appeared to be closed by early 1977, it was reconsidered at a Levee Board meeting in March 1981. The primary attraction of this alternate alinement is that rights-of-way would be easy to obtain from the two landowners. On the other hand, the GDM alinement would require rights-of-way from several other landowners. This alternative alinement would not increase the cost of the levee in this section over the cost of the GDM alinement. However, the environmental consequences would be significant. Approximately 670 acres would be inclosed between the proposed alinement and the GDM alinement. Of these acres, approximately 510 are bottomland

ALTERNATIVES

PLANS CONSIDERED IN THE 1974 FINAL EIS AND SUBSEQUENTLY ELIMINATED FROM FURTHER STUDY

6. The five alternatives described below were evaluated in the 1974 Final EIS.
7. Original GDM Alinement. This plan, recommended in the 1974 Final EIS, would follow the alinement of the existing loop levee and upgrade it into a hurricane protection levee (see Plate 2). Approximately 21 miles of existing levee on the west bank of Bayou Lafourche and 17 miles on the east bank of the bayou would be enlarged. Approximately 5 miles of levee on the east side and south of Yankee Canal would be new. The levee system would have a net grade elevation of +13.0 National Geodetic Vertical Datum (NGVD) at the southern end of the project and vary to +8.5 NGVD at the northern end. Floodwalls would be built where levee construction is not possible.
8. Building Codes. Two alternatives would have instituted building codes to require either elevation restrictions or structural stability restrictions. Both would protect new buildings, but would have been cost-prohibitive for existing buildings. These alternatives were discarded because they would provide little protection from water-borne debris and no protection for those people evacuating from areas south of Golden Meadow or for property, such as equipment and livestock.
9. Alternate Levee Alinement. This alinement would be immediately behind the populated areas along the bayou. By so locating the levee, there would be fewer ecological impacts than would occur with the GDM alinement. This alinement was not recommended because it would be more costly than the GDM alinement which follows existing locally built

PLANNING OBJECTIVES

5. The planning objectives are to: provide adequate protection from hurricane and storm-borne floodwaters, cause minimal loss of wetland due to borrow and levee alignment, maintain water quality, protect and enhance prehistoric and historic resources in the study area.

PUBLIC CONCERNS AND CORPS OPPORTUNITIES

2. The primary concern of the people and local government officials in the South Lafourche Levee District is hurricane and storm flood protection. The people who live along Bayou Lafourche from Larose to Golden Meadow and those who live and work south of Golden Meadow would benefit from project implementation. The bayou and the state highway along the bayou are major evacuation routes for the people of Grand Isle and extreme southern Lafourche Parish. With early warning of high waters and the levee protection from Larose to Golden Meadow, the evacuation time for these people could be shortened.

3. Hurricane flooding in or near the study area has occurred many times since 1900. However, reliable surge heights became available only since 1909. Observed stages experienced at or near the study area as a result of hurricanes were: 1909, 5 feet at Golden Meadow; 1915, 5.5 feet at Golden Meadow; 1956, (Flossy), 3.3 feet at Golden Meadow; 1961 (Carla), 3.7 feet at Golden Meadow; 1964 (Hilda), 4.7 feet at Golden Meadow; 1965 (Betsy), 5.4 feet at Leeville; 1974 (Carmen), 4.6 feet at Golden Meadow, 5.6 feet at Leeville. The extent to which the study area is subjected to a hurricane hazard is demonstrated by the magnitude of average annual flood damages which is estimated to be in excess of \$9 million.

4. There is some local concern as to whether the authorized culverts would adequately remove storm and post-storm floodwaters from within the ring levee. Consequently, at an added local expense, the levee board would install pumping stations to drain the waters within the ring levee. Presently, most of the area is drained by small, low-lift pumping stations. Finally, a local public concern is relinquishing property for right-of-way for the levee. Some people resent the confiscation of their property for public works.

NEED FOR AND OBJECTIVES OF ACTION

STUDY AUTHORITY

1. Public Law 298-89th Congress, 1st Session, approved 27 October 1965, authorized the project "Grand Isle, Louisiana and Vicinity" to provide protection in accordance with the recommendation of the Chief of Engineers in his report entitled "Grand Isle and Vicinity, La.," and contained in House Document No. 184, Eighty-ninth Congress, 1st Session. The report of the Chief of Engineers included the report of the Board of Engineers for Rivers and Harbors, accompanied by the reports of the District and Division Engineers. The Chief of Engineers, in his report, concurred with the following recommendations of the Board of Engineers for Rivers and Harbors:

"... Accordingly, the Board recommends authorization for construction of improvements for the prevention of hurricane tidal damages and loss of life in the area between Larose and Golden Meadow, Louisiana consisting of:

A loop levee approximately 36 miles in length along both banks of Bayou Lafourche;

Enlargement of about 3 miles of the existing levee at Golden Meadow;

Floodgates for navigation in Bayou Lafourche at the upper and lower bayou crossings;

Approximately 8 miles of low interior levees to regulate intercepted drainage, and

Seven drainage structures;...."

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TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE WATER BODIES	SIGNIFICANT RESOURCE WATER BODIES
Existing Condition: (1975 Base)	1,638 acres in SA; 107 and 105 acres of total attributable to inclusion of Clovelly Farms, and LL&E. pH and DO acceptable. Nutrient levels high as is turbidity. Ambient concentrations of Hg, Ca, Cr, and Cu exceed EPA criteria in SA.	Impact: 198 acres lost to levee right-of-way; 211 acres converted borrow right-of-way. Inclusion of LL&E accounts for 8 and 97 acres respectively of right-of-way acreage. 1,122 acres inclosed by levee in SA. Water quality impacts sim. lar to Plan 1, except slightly less.
FWD Available 2096:	3,202 acres in SA; 344 acres of total attributable to Clovelly Farm and LL&E. Salinity would rise due to saltwater intrusion and subsidence in SA. Nutrient levels would rise due to additional agriculture in SA.	Impact: 660 acres remaining in SA by 2096. 230 acres lost to levee right-of-way; 284 acres converted to borrow right-of-way. Clovelly Farm and LL&E accounts for 40 and 170 acres of these right-of-way acreage totals. 1,124 acres inclosed by levee in SA, farms account for 2 acres of inclosed acreage. Temporary turbidity caused by construction. Dredging might resuspend some heavy metals and chlorinated hydrocarbons in localized areas.
Plan 1 (FW) Available 2096:	604 acres remaining in SA by 2096. 150 acres of total attributable to exclusion of LL&E.	Impact: 222 acres lost to levee right-of-way; 187 acres converted to borrow right-of-way. Inclusion of Clovelly accounts for 32 and 73 acres respectively of right-of-way acreage. 1,124 acres inclosed by levee in SA, Clovelly accounts for 2 acres of inclosed acreage. Water quality impacts similar to Plan 1, except slightly less.
Plan 2 (FW) Available 2096:	Impact: 237 acres lost to levee right-of-way; 284 acres converted borrow right-of-way: Right-of-way acreage attributable to farms same as Plan 1. 773 acres inclosed by levee in SA. 344 acres excluded from this plan due to levee realignment in Section E South. Water quality impacts same as Plan 1.	Impact: 1,565 acres remaining in SA by 2096.
Plan 3 (FW) Available 2096:	Impact: 739 acres remaining in SA by 2096. 107 acres of total attributable to exclusion of Clovelly Farms.	Impact: 190 acres lost levee right-of-way; 114 acres converted borrow right-of-way. 1,122 acres inclosed by levee in SA. Water quality impacts similar to Plan 1, except slightly less.
Plan 4 (FW) Available 2096:	Impact: 573 acres remaining in SA by 2096. 344 acres of total attributable to exclusion of Clovelly and LL&E.	Impact: 198 acres lost to levee right-of-way; 211 acres converted borrow right-of-way. Inclusion of LL&E accounts for 8 and 97 acres respectively of right-of-way acreage. 1,122 acres inclosed by levee in SA. Water quality impacts sim. lar to Plan 1, except slightly less.
Plan 5 (FW) Available 2096:	Impact: 237 acres lost to levee right-of-way; 284 acres converted borrow right-of-way: Right-of-way acreage attributable to farms same as Plan 1. 773 acres inclosed by levee in SA. 344 acres excluded from this plan due to levee realignment in Section E South. Water quality impacts same as Plan 1.	Impact: 1,565 acres remaining in SA by 2096.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE FORESTS	ALTERNATIVE	SIGNIFICANT RESOURCE FORESTS
Existing Condition: (1975 Base)	141 acres WS and 881 acres BLHW in SA.	Impact:	19 acre WS and 260 acres BLHW lost to levee and borrow rights-of-way. Inclusion of LL&E accounts for 129 acres of BLHW lost rights-of-way. 122 acres WS and 621 acres BLHW inclosed by levee in SA. 31 acres BLHW (inclosed) attributable to inclusion of LL&E. Clovelly farm not included in this plan.
FWD Available 2096:	Over the project, an annualized 32 acres of WS and 456 acres of BLHW present in the SA.		
Plan 1 (FW) Available 2096:	1 acre WS and 165 acres BLHW in SA.		An annualized 20 acres of WS and 242 acres of BLHW present over the project life, and a net annualized loss of 12 and 214 acres, respectively.
Impact:	0 acre WS and 23 acres BLHW in SA.	Plan 4 (FW) Available 2096:	0 acres WS and 48 acres BLHW in SA.
Plan 1 (FW) Available 2096:	19 acres WS and 260 acres BLHW lost to levee and borrow rights-of-ways. Inclusion of Clovelly and LL&E accounts for 129 acres of BLHW lost in right-of-way. 122 acres WS and 621 acres BLHW inclosed by levee in SA. 31 acres BLHW (inclosed) attributable to inclusion of farms. An annualized 20 acres of WS and 242 acres of BLHW present over the project life, and a net annualized loss of 12 and 214 acres, respectively.	Impact:	Impacts same as Plan 2. Neither farm included in this plan.
Plan 2 (FW) Available 2096:	0 acre WS and 48 acres BLHW in SA. 26 acres of total BLHW remaining in 2096 attributable to exclusion of LL&E from this plan.	Plan 5 (FW) Available 2096:	An annualized 20 acres of WS and 303 acres of BLHW present over the project life, and a net annualized loss of 12 and 153 acres, respectively.
Impact:		Impact:	0 acre WS and 65 acres BLHW in SA.
Plan 2 (FW) Available 2096:	19 acres WS and 131 acres BLHW lost levee and borrow rights-of-way. 122 acres WS and 590 acres BLHW inclosed by levee in SA. No forest lost or inclosed attributable to inclusion of Clovelly farm with this plan.	Impact:	54 acres WS and 279 acres BLHW lost to levee and borrow rights-of-way. Inclusion of farms accounts for 129 acres BLHW lost due to rights-of-way. 43 acres WS and 313 acres BLHW inclosed by levee in SA. 31 acres BLHW (inclosed) attributable to inclusion of farms.
Impact:		Impact:	An annualized 19 acres of WS and 275 acres of BLHW present over the project life, and a net annualized loss of 12 and 153 acres, respectively.
Plan 3 (FW) Available 2096:	0 acres WS and 23 acres BLHW in SA.		

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE WILDLIFE	SIGNIFICANT RESOURCE WILDLIFE
Existing Condition: (1975 Base)	2,960 acres marsh and forest in SA, utilized by deer, squirrels, waterfowl, woodpecker, songbirds, etc. 1,638 acres of open water in SA, utilized by waterfowl, wading birds, gulls and terns, and alligators.	Plan 3 (FW) Available 2096: 36 acres marsh and forest in SA. 3,333 acres levee and pasture in SA. 739 acres open water in SA.
FWO Available 2096:	Impact: 540 acres marsh and forest in SA. 720 acres pasture in SA, utilized by rabbits, mourning doves and other birds. 3,202 acres open water in SA.	Impact: Similar to Plan 1, but slightly more open water wildlife and slightly less levee/pasture wildlife would be present in SA.
FWO Available 2096:	Impact: Numbers of forest and marsh dwelling wildlife in SA reduced as habitat is cleared or becomes open water. Numbers and kinds of open dwelling wildlife increased. Numbers of water-utilizing wildlife increased as marsh opens up.	Impact: 80 acres marsh and forest in SA. 3,336 acres levee and pasture in SA. 673 acres open water in SA.
Plan 1 (FW) Available 2096:	Impact: 23 acres of marsh and forest in SA. 3,417 acres of pasture/levee in SA. 660 acres of open water in SA.	Impact: Similar to Plan 1, but less reduction of marsh/forest wildlife and less gain in open habitat wildlife.
Plan 2 (FW) Available 2096:	Impact: 58 acres of marsh and forest in SA. 3,420 acres of agricultural/pasture and levee water in SA. 604 acres of open water in SA.	Impact: Similar to Plan 1, but slightly less severe for marsh and forest wildlife species.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE FISHERIES	SIGNIFICANT RESOURCE FISHERIES
Existing Condition: (1975 Base)	1,938 acres of marsh, 1,638 acres of open water in SA. 1,391,484 pounds potential annual estuarine fish harvest attributable to SA worth \$347,871.	Impact: 9,347 pounds potential annual estuarine fishery harvest worth \$2,333 attributable to SA. Other impacts same as Plan 1.
FWO Available 2096:	3 1/4 acres marsh and 3,202 acres of open water in SA. 268,532 pounds potential annual estuarine fish harvest attributable to SA, worth \$67,133.	Plan 4 (FW) Available 2096: 32 acres marsh and 673 acres of open water (329 acres deep borrow) in SA. Impact: 22,976 pounds potential annual estuarine fishery harvest worth \$5,744 attributable to SA. Other impacts same as Plan 1.
Plan 1 (FW) Available 2096:	0 acres marsh and 660 acres of 30-feet deep borrow pit in SA.	Plan 5 (FW) Available 2096: 81 acres marsh and 1,565 acres open water (621 deep borrow) in SA. Impact: 58,158 pounds potential annual estuarine fishery harvest worth \$14,539 attributable to SA. Other impacts similar to Plan 1 but less severe.
Plan 2 (FW) Available 2096:	Potential annual estuarine fishery harvest negligible in SA due to total marsh loss. Numbers and fish species diversity reduced because of loss of marsh and shallow open water. Benthic organisms and slow moving fish buried or destroyed by dredging during construction. Fish and benthic organisms in enclosed area destroyed. Temporary increase of turbidity would reduce prayary productivity and adversely affect larval and juvenile fish and shellfish.	Impact: 10 acres marsh and 604 acres open water (454 acres deep borrow) in SA. Impact: 7,180 pounds potential annual estuarine fishery harvest worth \$1,795 attributable to SA. Other impacts same as Plan 1.
Plan 3 (FW) Available 2096:	13 acres marsh and 739 acres of open water (535 acres deep borrow) in SA.	

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE ENDANGERED SPECIES AND THREATENED SPECIES
Existing Condition: (1975 Base)	No known endangered or threatened species residing in SA. Some may be transients in areas.
FWD Available 2096:	Same as base.
Plan 1 (FM) Available 2096:	Same as base.
Impact:	None.
Plan 2 (FM)	Same as Plan 1.
Plan 3 (FM)	Same as Plan 1.
Plan 4 (FM)	Same as Plan 1.
Plan 5 (FM)	Same as Plan 1.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE AUDUBON SOCIETY BLUE LIST SPECIES
Existing Condition: (1975 Base)	14 Blue List species in SA.
FWD Available 2096:	Same as base.
Impact:	Species utilizing marsh and forest would decline slightly. Species utilizing pasture would increase.
Plan 1 (FM) Available 2096:	Same as base.
Impact:	Species utilizing marsh and forest would decline. Species utilizing pasture would increase significantly.
Plan 2 (FM)	Similar to Plan 1.
Plan 3 (FM)	Similar to Plan 1.
Plan 4 (FM)	Similar to Plan 1.
Plan 5 (FM)	Similar to Plan 1, but impacts to marsh and forest Blue List species less.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE WATERBIRD NESTING COLONIES	ALTERNATIVE	SIGNIFICANT RESOURCE CULTURAL RESOURCES
Existing Condition: (1975 base)	1 nesting colony in SA.	Existing Condition: (1975 Base)	One National Register-eligible property, the M/V Fox located at the Larose Floodgate, in the SA. No recorded archaeological sites in the SA. Sites 16LP1, 16LP57, 16LP58, 16LP59, 16LP60, 16LP61, 16LP62, 16LP63, 16LP88 located near construction areas and will be avoided during construction
FWO Available 2096:	Same as base.		
Plan 1 (FW) Available 2096:	Same as base.		
Impact:	Floodside borrow and restriction of work on LL&E levee to non-nesting season would restrict impacts to possible frightening of birds during construction.	FWO Available 2096:	Same as base.
Plan 2 (FW)	None.	Plan 1 (FW) Available 2096 Impact:	Same as base.
Plan 3 (FW)	Same as Plan 1.		The M/V Fox, a National Register-eligible historic boat, will be adversely affected by the Larose Floodgate feature of this plan. Future studies may locate additional National Register-eligible properties in the SA.
Plan 4 (FW)	None.	Plan 2 (FW)	Same as Plan 1.
Plan 5 (FW)	Same as Plan 1.	Plan 3 (FW)	Same as Plan 1.
		Plan 4 (FW)	Same as Plan 1.
		Plan 5 (FW)	Same as Plan 1.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE RECREATION	ALTERNATIVE	SIGNIFICANT RESOURCE RECREATION
Existing Condition: (1975 Base)	406 man-days of potential big game, 1,155 man-days of potential small game and 878 man-days of potential waterfowl hunting in SA annually worth \$21,611.	Plan 5 (FW) Available 2096:	6 man-days of big game, 369 man-days of small game, and 26 man-days of waterfowl hunting in SA, worth \$1,902 annually.
FW Available 2096:	13 man-days of big game, 300 man-days of small game and 147 man-days of waterfowl hunting available in SA, worth \$3,382 annually. Hunting reduced, because of non-project induced habitat loss in SA.	Impact:	Least amount of hunting of all plans because less pasture would be induced, thus there would be less small game hunting.
Plan 1 (FW) Available 2096:	1 man-day big game, 465 man-days of small game and no waterfowl hunting in SA, worth \$1,922 annually.		
	Impact:	Hunting drastically reduced, especially big game and waterfowl as marsh and forest decline. Small game not as severely reduced because project would induce conversion of marsh and forest to pasture.	
Plan 2 (FW) Available 2096:	2 man-days of big game, 486 man-days of small game and 4 man-days of waterfowl hunting in SA, worth \$2,081 annually.	Impact:	Similar to Plan 1, but slightly less loss.
Plan 3 (FW) Available 2096:	2 man-days of big game, 462 man-days of small game, and 5 man-days of waterfowl hunting in SA, worth \$1,997 annually.	Impact:	Similar to Plan 1.
Plan 4 (FW) Available 2096:	3 man-days of big game, 487 man-days of small game and 12 man-days of water fowl hunting in SA, worth \$2,217 annually.	Impact:	Similar to Plan 1, but slightly less loss.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE AIR QUALITY
Existing Condition: (1975 Base)	Air quality generally good in SA.
FWD Available 2096:	Slight decline in air quality due to industrial and agricultural development.
Plan 1 (FW) Impact:	Air quality temporarily degraded by construction activity. Air quality slightly lowered due to project induced industrial and agricultural development.
Plan 2 (FW)	Same as Plan 1.
Plan 3 (FW)	Same as Plan 1.
Plan 4 (FW)	Same as Plan 1.
Plan 5 (FW)	Same as Plan 1.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE NOISE
Existing Condition: (1975 Base)	Noise in SA is not excessive.
FWD Available 2096:	Agricultural and commercial expansion would slightly increase noise levels.
Plan 1 (FW) Impact:	Construction would cause temporary increase in noise. This would be most objectionable in populated areas.
Plan 2 (FW)	Same as Plan 1.
Plan 3 (FW)	Same as Plan 1.
Plan 4 (FW)	Same as Plan 1.
Plan 5 (FW)	Same as Plan 1.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE ACRILCULTURAL/PASTURELAND (PRIME AND UNIQUE LANDS)	SIGNIFICANT RESOURCE ACRILCULTURAL/PASTURELAND (PRIME AND UNIQUE LANDS)
Existing Condition: (1975 Base)	5,764 acres agricultural/pastureland in SA.	Impact: 519 acres agricultural/pasturelands lost due to levee right-of-way. Clovelly Farm and LL&E property subject to hurricane induced flooding due to exclusion from levee alignment.
FWO Available 2096:	Agricultural/pasturelands in SA subject to hurricane induced flooding. Agricultural/pasturelands would increase due to clearing. Sugarcane acreage converted to soybean production.	Plan 5 Available 2096: Same as Plan 1.
Plan 1 (FW) Available 2096: rem	5,547 acres agricultural/pasturelands in SA.	Impact: 217 acres agricultural lands lost due to levee right-of-way. Agricultural/pasturelands within LL&E & Clovelly alignment protected from hurricane induced flooding.
Plan 2 (FW) Available 2096:	5,270 acres agricultural/pasturelands remaining in SA.	Impact: 494 acres agricultural/pasturelands lost due to levee right-of-way. LL&E property subject to hurricane flooding due to exclusion from levee alignment. Clovelly protected.
Plan 3 (FW) Available 2096:	5,322 acres agricultural/pasturelands remaining in SA.	Impact: 242 acres agricultural/pasturelands lost due to levee right-of-way. Clovelly Farm property subject to hurricane induced flooding due to exclusion from levee alignment. LL&E protected.
Plan 4 (FW) Available 2096:	5,245 acres agricultural/pasturelands remaining in SA.	

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE COMMUNITY COHESION	ALTERNATIVE	SIGNIFICANT RESOURCE COMMUNITY GROWTH
Base:	Study area subject to hurricane flooding which adversely affects industrial and commercial activities, destroys crops, and creates health hazards for residents. Adverse impacts exist to community cohesion.	Base:	Limited population in project area. Highest concentration in affected portion of Larose.
FWO:	Flooding hazard would continue to exist - adverse impacts to community cohesion would continue.	FWO:	No growth projected for project area.
Plan 1:	Levee would provide substantial degree of flood protection to residents and property. Realignment of floodwall to include more of the developed area of Larose would also increase community cohesion.	Plan 1:	No impact on community growth.
Plan 2:	Similar to Plan 1; however, LLAE would be eliminated from protection.	ALTERNATIVE	SIGNIFICANT RESOURCE BUSINESS AND INDUSTRIAL ACTIVITY AND REGIONAL GROWTH
Plan 3:	Similar to Plan 1; however, Clovelly Farms would be eliminated from protection.	Base:	Numerous oil and gas fields in study area. Commercial fishing and agriculture are important in project area.
Plan 4:	Similar to Plan 1; however, both farm properties would be eliminated from protection.	FWO:	Potential growth linked to oil and gas industry.
Plan 5:	Same as Plan 1.	Plan 1:	Potential for project-induced commercial and residential development in Clovelly and LLAE.
		Plan 2:	Similar to Plan 1; however, no development encouraged in LLAE.
		Plan 3:	Similar to Plan 1; however, no development encouraged in Clovelly.
		Plan 4:	Produces no project-induced potential for growth.
		Plan 5:	Same as Plan 1.

TABLE 3
COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)

ALTERNATIVE	SIGNIFICANT RESOURCE LOCAL GOVERNMENT FINANCE, TAX REVENUES, AND PROPERTY VALUES
Base:	Tax base, property values, and tax revenues all impact government services.
FMO:	No impact to tax base, property values, or tax revenues.
Plan 1:	Property values in SA would increase due to flood protection. Property and sales tax revenues would also increase. Local government would bear partial cost of construction and all operation and maintenance.
Plan 2:	Same as Plan 1.
Plan 3:	Same as Plan 1.
Plan 4:	Same as Plan 1.
Plan 5:	Same as Plan 1.

ALTERNATIVE	SIGNIFICANT RESOURCE EMPLOYMENT AND LABOR FORCE
Base:	Employment concentrated in mining, agriculture, and commercial fishing.
FMO:	Continued concentration in the mining, agricultural, and commercial fishing sectors.
Plan 1:	Employment in all sectors would benefit from disruptions prevented by flood protection. Short-term benefit in construction sector.
Plan 2:	Similar to Plan 1, except disruption and lost working days associated with flooding on LL&E would occur.
Plan 3:	Similar to Plan 1, except disruption and lost working days associated with flooding on Clovelly could occur.
Plan 4:	Similar to Plan 1, except disruption and lost working days associated with flooding at LL&E and Clovelly could occur.
Plan 5:	Same as Plan 1.

COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)
 (Oct 1983 PRICES IN \$ THOUSANDS; 3 1/4 PERCENT; 100-YEAR PERIOD OF ANALYSIS)

Item	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5
First Costs-Construction	40,355	39,349	39,709	38,703 ^{1/}	44,935 ^{2/}
First Costs-Mitigation	2,250	2,092	2,138	1,980 ^{3/}	2,250
Total First Costs	42,605	41,441	41,847	40,683	47,185
Total Average Annual Costs	1,746	1,703	1,711	1,668 ^{4/}	1,901 ^{5/}
Total Average Annual Benefits	9,997	9,921	9,930	9,854 ^{6/}	9,997
Net Benefits	8,251	8,218	8,219	8,186	8,096
Benefit-to-Cost Ratio	5.7	5.8	5.8	5.9	5.3

^{1/} From LMV Form 23A-R, plus \$2,762 for Larose Floodwall realinement.

^{2/} Includes \$4,580 for E South alternative.

^{3/} 0.88 x \$2,250 total mitigation costs (percentage based on ratio of habitat units lost to total habitat units lost with recommended plan) include zero mitigation for Larose Floodwall realinement.

^{4/} From LMV Form 23A-R, minus "Fish and Wildlife Losses" plus mitigation costs of \$72 (0.88 x \$82 total average annual mitigation costs of recommended plan); plus \$95 for Larose Floodwall realinement which includes zero mitigation.

^{5/} Includes \$155 for E South alternative with zero mitigation.

^{6/} From LMV Form 23A-R, plus \$68 for Larose Floodwall realinement.

NOTE: Because the components that make up Plan 4 are included in all other plans, the footnotes associated with Plan 4 also apply to all other plans.

TABLE 3

COMPARATIVE IMPACTS OF ALTERNATIVES (Continued)
 (Oct 1983 PRICES IN \$ THOUSANDS; 3 1/4 PERCENT; 100-YEAR PERIOD OF ANALYSIS)

Item	Clovelly Farms	LL&E
First Costs - Construction	646	1,006
First Costs - Mitigation	112 ^{1/}	158 ^{2/}
Total First Costs	758	1,164
Total Average Annual Costs	353 ^{3/}	434 ^{4/}
Average Annual Benefits	67	76
Net Benefits	32	33
Benefit-to-Cost Ratio	1.9	1.8

1/ 0.05 x \$2,250 total mitigation costs. Percentage based on ratio of
 habitat units lost to total habitat units lost with recommended plan.
 2/ 0.07 x \$2,250 total mitigation costs. Percentage based on ratio of
 habitat units lost to total habitat units lost with recommended Plan.
 3/ Includes \$4 for mitigation ($0.05 \times \82 total average annual mitigation
 costs of recommended plan)
 4/ Included \$6 for mitigation ($0.07 \times \82 total average annual mitigation
 costs of recommended plan)

SOURCE: Grand Isle, Louisiana and Vicinity (Larose to Vicinity of Golden Meadow), Clovelly Farms and LL&E, Design Memorandum No. 1 - General Design - Supplement No. 1, February 1984.

AFFECTED ENVIRONMENT

ENVIRONMENTAL CONDITIONS

30. The study area lies entirely within Lafourche Parish and encompasses approximately 10,362 acres. The study area includes all the lands along the levee rights-of-way which would be impacted by levee and borrow construction, utility relocations, temporary stockpile areas, and those areas inclosed by the levee which were not addressed in the 1974 Final EIS (Plates 2-8). The project is situated in an ancient lobate delta of the Mississippi River, the Lafourche Delta. Many of the area bayous are former distributaries of the old Mississippi River; Bayou Lafourche was a distributary of the present Mississippi River until 1904 when river access to the bayou was blocked. Area soils are typically river-deposited clays, silts, and sands near the bayous. The marshes of the study area have soft, highly organic deposits ranging from organic/clay to peat. The organic content of fresh marshes is higher than that of the more saline marshes. The elevations in the area vary between 0.0 and 1.0 foot NGVD in the marshes to 3.0 and 8.0 feet NGVD at the crests of the natural levee ridges.

31. The climate of the area is greatly influenced by the proximity of the Gulf of Mexico. Southeasterly winds from the gulf moderate the climate giving it a humid, sub-tropical character. Air temperature varies with monthly averages of 57°F in January and February and 83°F in August. Tidal effects have been observed up Bayou Lafourche as far north as Larose, Louisiana. The tides are normally diurnal and range less than 1 foot. Hurricane tides have been recorded up to 5.5 feet NGVD at Larose, Louisiana. A hurricane induced surge could cause a water level rise of 10 feet NGVD at Golden Meadow.

32. The habitat types presently in the study area include 881 acres of bottomland hardwood forest, 141 acres of wooded swamp, 1,093 acres of

areas would be re-concentrated to a greater degree on other available existing recreational lands.

Air Quality

71. Air quality in Lafourche Parish is better than national standards for nitrogen dioxide, carbon monoxide, sulfur dioxide, and suspended particulates (see Table A.9.1, Appendix A, Section A.9, Air Quality).

72. Under future without project conditions, air quality would decline slightly as increased vehicle and boat traffic, and commercial and industrial development, add additional air-borne pollutants into the air.

Noise

73. Highway sounds and motorized boat traffic on Bayou Lafourche and other waterways are the major contributors to noise in the study area.

74. Under future without project conditions, urban, agricultural, and oil industry expansion would increase noise levels throughout the study area.

Agricultural/Pasturelands (including prime and unique farmlands)

75. Within the study area, 5,764 acres of agricultural/pasturelands exist (2,468 acres in Clovelly Farms including 31 acres low levee; 3,296 acres in LL&E farms including 26 acres low levee). Additionally, extensive acreage previously described in the 1974 Final EIS exists between the levee alignment and Bayou Lafourche and is presently in pasture, sugarcane and row crops. Lands utilized for sugarcane, and crawfish production are considered unique farmlands. About 500 acres of crawfish ponds and 1,650 acres of sugar cane/soybeans fields are present on the LL&E and Clovelly Farms.

16LF36 is an earthen midden; site 16LF76 is a buried shell midden. On the eastern boundary of Section F, between the GIWW and Clovelly Farms, a buried shell midden 16LF97, is recorded. The site is situated on a buried natural levee along an unnamed former stream course.

67. In the vicinity of the Larose floodgate, seven recent structures and one abandoned vessel were recorded. The structures did not meet the criteria for inclusion on the National Register of Historic Places. The M/V Fox, an historic passenger vessel, has been determined eligible for inclusion in the National Register.

68. Under future without project conditions, the area's cultural resources would continue to be affected by indiscriminate human actions, erosion, subsidence, and the natural elements. For further information, refer to Appendix A, Section A.6, Archeology Resources.

Recreation

69. The natural and recreational resources of the study area provide wide and varied opportunities for outdoor recreational activities. Outdoor recreational facilities consist mostly of public and commercial boat launching ramps or slings. Additionally, there is one state wildlife management area which offers public hunting for big game, small game, and waterfowl. The large communities within the area provide small scale community parks, playgrounds, and picnic areas.

70. Under future without project conditions, a decrease in the overall potential supply of recreational man-days would occur (see Recreational Resources, Appendix A, Section A.7 for more detail). This decrease would be attributed to the non-project induced clearing of forestlands and the draining of areas inclosed by levee systems for urban and agricultural purposes. Additionally, displaced recreational activities that normally would occur on the previously uncleared and undrained

white ibis-30. In July, 1980, the colony was visited by USFWS personnel, and a large number of Louisiana heron adults and young also were observed. The birds nest in a small grove of Chinese tallowtrees and, undoubtedly, feed upon the crawfish, other invertebrates, and small fish which occur in the nearby crawfish ponds.

63. Under future without project conditions, there will be no impact on the nesting colony.

Cultural Resources

64. The cultural resources in the vicinity of the study area include prehistoric shell midden and earthen midden sites, standing structures, and an abandoned vessel. No recorded archeological or historical sites are listed on the National Register of Historic Places. However, one property, the M/V Fox, has been determined eligible for inclusion in the National Register. In addition, two prehistoric midden sites, 16LF1 and 16LF88, have the potential of furnishing data on human adaptation to the physical environment, and may be eligible for listing on the National Register of Historic Places. Site 16LF1, an earthen and shell midden, is located on the Bayou L'Ours natural levee. Site 16LF88, a village or campsite with a midden area, is reported to be located on the Bayou Raphael natural levee.

65. The natural levees of Bayou Raphael and the West Fork of Bayou L'Ours are considered optimal locations for prehistoric occupations. Besides sites 16LF1 and 16LF88, other recorded sites along these levees include 16LF54, 16LF57, 16LF58, 16LF59, 16LF60, 16LF61, 16LF62, and 16LF63.

66. Two sites, 16LF36 and 16LF76, are recorded along the Gulf Intracoastal Waterway (GIWW) in the vicinity of the study area. Site

endangered or threatened species status, none of them occur in the study or area.

Under future without project conditions, it is likely that as marsh and wooded habitat are lost, the number of endangered and threatened species that might be transient would decline.

National Audubon Blue List Species

60. The National Audubon Society Blue List is an early warning system to indicate which bird species are undergoing noncyclical population declines and might be declining in all or parts of their range in North American (Tate and Tate, 1982). The following is a list of the 1982 Blue List species which could occur in the study area.

1982 AUDUBON BLUE LIST

Least Bittern	Barn Owl
American Bittern	Eastern Bluebird
Sharp-shinned Hawk	Long-billed Curlew
Red-shouldered Hawk	Eastern Meadowlark
King Rail	Hairy Woodpecker
Loggerhead Shrike	Upland Sandpiper
Grasshopper Sparrow	Dickcissel

61. Under future without project condition, it is likely that as marsh and wooded habitat are lost, Blue List species closely associated with these habitats would be negatively affected.

Waterbird Nesting Colonies

62. One nesting colony of wading birds occurs in the southern part of LL&E property. The number of nesting adults in this colony in 1976 were: cattle egret-2,400, great egret-100, little blue heron-250, and

57. The intermediate to brackish ponds and bayous provide essential habitat for certain stages of the life cycles of a variety of estuarine fishes. The young of Gulf menhaden, spot, Atlantic croaker, white and brown shrimp, and blue crabs utilize the marshes as nursery areas. Upon reaching maturity, the shrimp and fishes leave the marshes for the gulf. Spotted and sand seatrout, sea catfish, striped mullet, tidewater silversides, sheepshead minnow, sailfin molly, bay anchovy, longnose killifish, Atlantic threadfin, bay whiff, and southern flounder can also be found. Planktonic organisms in the canals, bayous, and ponds include minute crustaceans such as cladocerans, copepods, and ostracods. Chironomid larvae and tubificid worms are the dominant benthic organisms in fresh areas. The benthos in the brackish water bodies include polychaete worms, clams, mysids, isopods, amphipods, and decapods.

58. Table A.3 (see Fishery Methodology, Section A.3, Appendix A) provides a summary of the 1963-1978 average annual commercial fish harvest and the major estuarine-dependent commercial finfish and shellfishes for Hydrologic Unit IV of which the study area is a part. Based on this data, the study could potentially provide 1,391,484 pounds worth \$347,871 to the commercial fish harvest in base year 1975. Under future without project conditions, freshwater and estuarine fish productivity and commercial fish harvest would decrease as essential fresh/intermediate and brackish marsh are lost.

Endangered and Threatened Species

59. There are no known endangered or threatened species which reside in the study area (see USFWS and NMFS correspondence, Appendix A, Section A.2). Several endangered birds, such as the brown pelican, bald eagle, peregrine falcon, and Eskimo curlew, might be seen occasionally as transient visitors. The American alligator has been removed from the endangered species list (Louisiana only) although it is still listed as threatened due to similarity of appearance in Louisiana. Although several species of plants from Louisiana are being reviewed for

52. Louisiana, with its extensive coastal marshes, leads the nation in wild fur production, contributing 40 percent of the entire United States fur supply. The nutria is the state's most important furbearer, with ninety-five percent of nutria pelts in the world coming from Louisiana. During the 1979-80 trapping season, there were 1,300,000 hides taken, valued at nearly \$9,000,000. The muskrat is the second most important furbearer, while mink, otter, and raccoon are of less commercial significance (see Appendix A, Section A.8, for a table of fur catch and value by marsh type).

53. In 1972, after a 20-year moratorium on hunting, special hunting seasons were held for the American alligator in western Louisiana. By 1980, over 15,000 animals worth about \$3.1 million (gross value) were being taken annually. The entire state was opened to alligator hunting in 1982.

54. Numerous terrestrial invertebrates occur throughout the area. The most notable are insects, which often serve as vectors to transmit disease to higher animals, including man. Mosquitoes are the most important of the vectors in the area, although other groups, such as deerflies, horseflies, and biting midges are also present.

55. Under future without project conditions, wildlife diversity in the study area would decrease as essential habitat is lost due to urban and agricultural expansion, saltwater intrusion, subsidence, and erosion.

Fisheries

56. Both freshwater and estuarine fish occur in the study. Freshwater fish, such as mosquitofish and killifishes, can be found in the ponds, canals, and bayous where aquatic vegetation grows; freshwater drum and sunfishes prefer more turbid waters of Bayou Lafourche and adjacent canals. Other freshwater fishes include largemouth bass, threadfin and gizzard shad, channel catfish, longnose gar, largemouth buffalo, and smallmouth buffalo.

soras. Game mammals and commercially important furbearers which occur in these marshes include white-tailed deer, swamp rabbit, nutria, otter, raccoon, and mink. American alligators are abundant. Many of these animals feed on crawfish, insects, snails, and small fish which are abundant. White-tailed deer prefer these low salinity marshes to the brackish marshes because of higher plant diversity which provides an abundance of food.

48. The brackish marshes also support a variety of wildlife. Migratory waterfowl and wading birds feed and rest here, mottled ducks probably nest in these marshes, and clapper rails are common. Commercially important furbearers include muskrat, otter, raccoon, and mink. Swamp rabbit and white-tailed deer can be found occasionally, especially if there are elevated areas such as canal ridges available for feeding, escape, and cover. American alligators, particularly adults, sporadically occur.

49. The bottomland hardwoods near the levee alignment are of moderate quality; therefore, they are capable of supporting huntable populations of deer, squirrels, rabbits, raccoons, and opossums. A variety of reptiles, amphibians, birds, and small rodents also can be found here. The forests along Bayous Raphael and L'Ours, contiguous to developed areas of pasture, are heavily grazed by cattle and free-roaming hogs. Thus, white-tailed deer populations are low.

50. Wildlife associated with the ponds, bayous, and canals include wading birds, wood ducks, mallards, nutria, muskrat, otter, mink, raccoon, frogs, numerous snakes and turtles, and the American alligator.

51. Agricultural lands support a variety of wildlife, such as seed-eating and insectivorous birds (mourning dove, common snipe, eastern meadowlark, and cattle egret). Other common inhabitants include eastern cottontail, swamp rabbit, nine-banded armadillo, marsh rice rat, opossum, American goldfinch, eastern bluebird, red-tailed hawk, American kestrel, and barn owl.

and saltwater intrusion. In addition, salinity levels in the marshes and open-water areas would continue to rise. Nutrient levels would be expected to increase as more lands are put into agricultural uses.

Forests

45. There are primarily two types of forests which occur in the study area. There are 141 acres of wooded swamp and 881 acres of bottomland hardwoods. Baldcypress and tupelogum are the dominant trees in the swamps; red maple occurs along the drier edges. The most abundant understory plant is Virginia willow. These swamps provide habitat for crawfish, wading birds, waterfowl, furbearers, and the American alligator. Wooded swamps also provide valuable timber, esthetic values, and recreational opportunities. Dominant trees present in bottomland hardwoods are red maple, green ash, hackberry, and sweetgum. Palmetto, wax myrtle, and eastern baccharis are the dominant understory plants. These forests provide habitat for deer, eastern cottontail rabbit, gray and fox squirrels, and songbirds. Most bottomland hardwoods in the study area are regularly flooded; when flooded, they provide habitat for fish and crawfish.

46. Under future without project conditions, wooded swamp and bottomland hardwoods would be drastically reduced by the year 2096.

Wildlife

47. The fresh/intermediate marshes provide high quality habitat for a variety of wildlife species. Resident mottled ducks nest and feed in these marshes, especially where the marsh is contiguous with ponds. Migratory waterfowl including mallards, blue-winged teal, green-winged teal, gadwalls, American widgeons, shovellers, pintails, ring-necked ducks, lesser scaup, common moorhen, and American coots are also present. Other water birds which utilize these wetlands include snipes, egrets, herons, ibis, bitterns, black-necked stilts, king rails, and

include Yankee Canal, Breton Canal and Scully Canal. Other water bodies include 1,638 acres of open water associated with the marsh in the study area. Also, there are numbers of unnamed oil, gas, and drainage canals within these areas.

42. The existing water has a high buffering capacity and a pH between 7.3 and 7.9. Existing dissolved oxygen (DO) levels remain at or above the acceptable levels set by the State of Louisiana of 4.0 mg/l in Bayou Lafourche and 5.0 mg/l in surrounding coastal waters. The study area is characterized by high ambient nutrient levels, presumably from urban and agricultural runoff. Salinity levels are gradually rising in the marshes due to saltwater intrusion and general land subsidence. Ambient turbidity averages vary from 120 nephelometric turbidity units (NTU) in Bayou Lafourche to 17.5 NTU in adjacent marshes and lateral canals. Data from six sampling sites spaced throughout the study area (see Plate 11) revealed ambient toxic metal levels which exceed applicable Environmental Protection Agency (EPA) criteria for aquatic life in the case of four metals: mercury, chromium, cadmium, and copper. Seriously high levels of mercury and copper were detected at one site each. Of the eleven chlorinated hydrocarbons measured at each of the six stations, dieldrin, endrin, and heptachlor were found in concentrations which exceeded applicable EPA criteria. Heptachlor was detected at a seriously high level at one station.

43. The fresh to intermediate bayous, canals, and open-water areas support a variety of recreationally and commercially important wildlife and fishery species. The brackish water bodies provide less valuable habitat for migratory waterfowl, fur bearers, and freshwater fish. However, these estuarine waters provide nursery areas for many commercially and recreationally important estuarine and marine fish and shellfish.

44. Under future without project conditions, open-water bodies in the study area would increase significantly due to land subsidence, erosion,

38. The fresh/intermediate marshes in the study are dominated by bulltongue, bullwhip, Cyperus, wiregrass, and narrow-leaf cattails. Sedges, Walters's millet, cutgrass, and dwarf spikerush also occur. Salinity varies from 0 to 6 parts per thousand (ppt) according to Chabreck (1972). This marsh type is utilized by nutria, wading birds, migratory ducks and geese, numerous fish, and alligators. Various estuarine fish and shellfish use the intermediate marsh as a nursery area. As it floods, this marsh acts as a storage area for storm waters. The detritus produced in the marsh is a vital part of the food base of the aquatic ecosystem. This marsh provides many user-days of hunting and fishing.

39. The brackish marsh is dominated by wiregrass, oystergrass, and saltgrass. The salinity in these marshes ranges between 1 and 10 ppt (Chabreck, 1970). This marsh type is utilized by muskrat, moderate numbers of migratory waterfowl, wading birds, and a few reptiles and amphibians. It is important nursery habitat for certain estuarine fish—notably menhaden, shrimp, and shellfish. The detritus produced by brackish marsh is flushed into adjacent water bodies where it provides an important food source. Brackish marshes support less hunting and trapping than fresh/intermediate marshes.

40. Under future without project conditions, the natural marshes within the study area would severely decrease due to factors such as land subsidence and saltwater intrusion. Urban and agricultural development also would occur in the study area, but at a slow rate. Over the project life, there would be an average annualized 298 acres of fresh to intermediate marsh and 685 acres of brackish marsh.

Water Bodies

41. The study area contain extensive areas of water bodies which range from fresh to brackish. Major natural waterways include Bayou Lafourche, Bayou Raphael and West Fork Bayou L'Ours. Man-made canals

TABLE 4
PROTECTION
REGULATIONS

RESOURCE	ECOLOGICAL ATTRIBUTES	CULTURAL ATTRIBUTES	ESTHETIC ATTRIBUTES	PROTECTION REGULATIONS	
				STATE	FEDERAL
SARMS	habitat for fish and wildlife, especially extractive economy of waterfowl, wading birds, the area.	Typical Louisiana sedge wetland, including areas in a marsh.	Coastal Zone Act of 1972, La. State and Local Coastal Resources Management Act of 1974, Section 101 of the Hillbilly Act of 1990, Estuary Protection Act, Louisiana	Coastal Zone Act of 1972, La. State and Local Coastal Resources Management Act of 1974, Section 101 of the Hillbilly Act of 1990, Estuary Protection Act, Louisiana	Coastal Zone Act of 1972, La. State and Local Coastal Resources Management Act of 1974, Section 101 of the Hillbilly Act of 1990, Estuary Protection Act, Louisiana
ATRIBUTES	Major nursery area for estuarine dependent fish and shellfish.	---	---	Clean Water Act of 1972, La. Water Control Law, Estuary Protection Act.	National Estuary Program and Clean Waters for Multiple Uses.
FORESTS COPPER AND BUTTELAND HARBOURS	Viable habitat for fish and wildlife, especially extractive economy of industry.	Supports the traditional extractive economy of the area.	Typical Louisiana sedge wetland, especially express, induberous. Nursery area for fish.	Coastal Zone Act of 1972, La. State and Local Coastal Resources Management Act of 1974, 17,760 acres per year Protection of Wetlands, Trees (La. R. 1993).	Environmental Groups desire preservation at rate of 1% per year.
WILDLIFE	Numerous species of wildlife utilize project area.	---	---	Fish and Wildlife Coordination Act	Species of concern protection, hunting or trapping in certain areas.
FISHERIES	Numerous species of fish and shellfish utilize project area.	---	---	Fish and Wildlife Coordination Act	Species of concern protection, fishing rights.
ENDANGERED SPECIES	No species breeding in study area. Some species are transients.	---	---	Endangered Species Act, Endangered Fauna Act.	Species protection.
BIRDS ON A DOWNS SIGHT BLUE LIST	Showing decline in numbers or decrease in range.	---	---	Audubon Society	Species of concern in study area.
WATER BIRD NESTING SIGHT	Breeding site for many marsh birds.	Local cultures traditionally used young nestlings (Grosbeak) for food.	---	Fish and Wildlife Coordination Act, the Convention of International Bird Treaty of 1914.	Species protection.

SIGNIFICANT RESOURCES

35. This section describes each significant resource listed in Table 3. A given resource is designated as significant because: it is identified in the laws, regulations, guidelines, or other institutional standards of national, regional, or local agencies; it is specifically identified as a concern by local public interests; or it is judged by the Corps of Engineers to be of sufficient importance to be so designated (Table 4). Social resources are discussed as required by Section 122 of the River & Harbor Act.

Marshes

36. Fresh/intermediate and brackish marshes exist within the study area (see Plate 8). Much of the area was fresh/intermediate marsh prior to channelization and levee construction along the Mississippi River and closure of Bayou Lafourche. These actions prevented the overflow of sediment rich waters into the surrounding wetlands and have contributed to the marsh decline as have other man-induced and natural conditions. Most of the marsh that existed within the GDM alignment prior to construction of the local levee was drained long ago and converted to drier habitat types. The few exceptions have remained fairly natural marsh. Fresh/intermediate marsh lies just outside the levee and extends south to within 2 miles of Yankee Canal on the east and nearly to Belle Amie on the west. Brackish marsh lies southward, but extends much farther north on the west side of Bayou Lafourche because of saltwater intrusion caused by canal building for oil, gas, and sulphur extraction.

37. The only marsh described in the 1974 Final EIS was 2,700 acres of brackish marsh and open water southeast of Golden Meadow and "several small areas of marsh scattered throughout the area." In actuality, there were 1,093 acres of fresh/intermediate marsh and 845 acres of brackish marsh in the study area in addition to the 2,700 acres originally discussed.

fresh/intermediate marsh, 845 acres of brackish marsh, 1,638 acres of open water, and 5,764 acres of agricultural/pastureland. Of the 5,764 acres of agricultural/pastureland, approximately 57 acres consist of low private levee, which based on its value to wildlife is comparable to pastureland and for the purpose of this report will be treated as such. Scrub-shrub, agricultural land, residential/commercial, existing low levee, forest and open-water areas that lie between the proposed modified GDM levee and Bayou Lafourche have been previously addressed in the 1974 Final EIS and are not addressed in this report. The important animal species which inhabit the wetland habitats include brown and white shrimp and blue crabs; freshwater fish such as largemouth bass and catfish; estuarine fish such as menhaden and croakers; American alligator; waterfowl; and mammals such as white-tailed deer, nutria, and muskrat. The marshes and forest in the study area provide areas for recreational hunting and fishing. Pointe au Chien WMA provides high quality waterfowl hunting.

33. The cultural resources within the study area include prehistoric shell and earthen middens. Sites characteristically occur on the crests of natural levees, along abandoned or active stream courses. These natural levee's have subsided to marsh level or near subsurface level; in many cases, sites are buried under recent alluvium. One National Register-eligible property, a historic boat named the M/V Fox, was recorded in the study area near the Larose floodgate.

34. The economy of the study area is primarily agricultural and water related. The areas along Bayous Lafourche, Manuel, Hospital, L'Ours, and Raphael (exclusive of developed urban areas) are considered prime farmlands. Areas growing sugarcane and crawfish are considered to be unique farmlands. Other crops include corn and soybeans. The waterborne industries include fishing, shrimping, boat-building, and barge transportation and loading facilities. In addition, oil storage is an important industry for the area.

76. Under future without project conditions, agricultural/pasturelands in the study area would increase as forestlands and marshes are cleared, drained, and replaced with pasture, row crops, and sugarcane. However, these newly cleared lands would not be classified as prime farmland. Sugarcane areas are expected to be converted to soybean production.

Community Cohesion

77. The study area is subject to flooding by surges which accompany hurricanes approaching on a critical path. The surges move over the low coastal marshes and into inland areas creating hazards to human life and causing widespread destruction of homes and business establishments. Industrial and commercial activities are interrupted, crops are destroyed, residents suffer severe hardships, and health hazards are created. In addition to the actual adverse effects of tidal flooding, the existence of the flood hazard acts to adversely impact on the peace of mind and community cohesion of area residents.

78. Under future without project conditions, study area residents would continue to be subjected to the existing flooding hazard and the resultant adverse impacts on public health and safety, peace of mind, and community cohesion.

Community Growth

79. Within the study area, the largest concentration of inhabitants is that portion of Larose that would be affected by the proposed floodwall realinement. The population in this area is small, numbering about 600.

80. Under future without project conditions, the study area is not expected to grow, as the portion of Larose in the study area is already virtually developed to its maximum extent. Other locations in the study area are not projected to show any residential or commercial

development. Clovelly Farm and the LL&E area are expected to remain in their current agricultural and oil production uses.

Business & Industrial Activity and Regional Growth

81. Economic activity in the study area is varied. Extensive oil and gas fields exist in and adjacent to the area. Commercial fishing, agriculture, and industries such as shipyards for the manufacture and repair of shrimp and oyster fishing vessels and other work boats are important.

82. The future without project conditions of the general business environment, as well as any potential industrial growth in the study area, are closely linked to the future state of the oil and gas industry and the maintenance of the commercial fisheries resource.

Local Governmental Finance, Tax Revenues, and Property Values

83. Local governmental finance is concerned with items such as the tax base, property values, and tax revenues, and the impact of these items on the financial condition of local governmental units. Financial soundness, of course, is important because it often determines the level

and quality of many necessary public services provided by local governments.

84. Under future without project conditions, there would be no significant changes to the tax base, property values or tax revenues.

Employment and Labor Force

85. Employment in Lafourche Parish in 1980 was concentrated in trade, services, manufacturing, government, construction, mining, agriculture,

forestry, and fisheries. This concentration was similar to statewide data, except in the areas of mining and agriculture, forestry, and fisheries. Lafourche Parish employment in these areas was more concentrated relative to comparable statewide data. Approximately 11.6 percent of the parish civilian labor force was employed in these industry sectors while the statewide average was approximately 7.1 percent.

86. Under future without project conditions, study area employment is expected to remain concentrated in mining, agriculture, and fisheries.

ENVIRONMENTAL EFFECTS

SIGNIFICANT RESOURCES

87. This section discusses the impacts that each alternative plan would have on the significant resources discussed in the previous section. Table 5 shows the acres impacted for the construction alternatives on each habitat type in the study area. Table 6 shows the number of acres of each habitat type impacted on the Clovelly Farm and Louisiana Land and Exploration Company (LL&E) property. Each farm segment is addressed separately, where appropriate, so that incremental impacts associated with each farm segment can be evaluated. Table 7 shows the number of acres of each habitat type which would be affected by construction in each work segment located along the modified GDM alignment excluding the farm segments in Table 6. Data in these Tables represent acres that were present in 1975 when construction of the project began.

88. Mitigation Plan. A mitigation plan is currently being formulated to compensate for loss incurred as a result of project construction.

MARSHES

89. Plan 1 (RP-NED). Under the RP, 370 acres of fresh/intermediate marsh and 291 acres of brackish marsh would be directly lost due to levee construction and borrow rights-of-way (see Table 5). Approximately 723 acres of fresh/intermediate marsh and 554 acres of brackish marsh would be converted to pasture and residential/commercial due to inclosure of these habitats by the levee system. The majority of the fresh/intermediate marsh loss (754 acres) is in Section E South, and over half of the brackish marsh loss (538 acres) is in Section A East (see Table 6). Fresh/intermediate marsh and brackish marsh loss attributed to the Clovelly and LL&E farms would be 110 and 54 acres respectively (Table 7). By 2096, there would be no fresh/intermediate

TABLE 5

COMPARISON OF POTENTIAL HABITAT LOSSES IN THE STUDY AREA UNDER THE DIFFERENT ALTERNATIVES
(DATA BASED ON ACRES PRESENT IN 1975)

Alternatives	Fresh/Intermediate Marsh	Brackish Marsh	Open water	Wooded Swamp	Bottomland Hardwoods	Agricultural Lands ^{1/}	Total Acreage Impacted
Plan 1 (TSP)							
LEVEE RIGHT-OF-WAY	216	186	230	10	152	217	1,011
BORROW	154	105	284	9	108	0	660
INCLOSED	723	554	1,124	122	621	0	3,144
Total	1,093	845	1,638	141	881	217	4,815
Plan 2							
LEVEE RIGHT-OF-WAY	216	186	222	10	78	494	1,206
BORROW	154	51	187	9	53	0	454
INCLOSED	723	554	1,124	122	590	0	3,113
Total	1,093	791	1,533	141	721	494	4,773
Plan 3							
LEVEE RIGHT-OF-WAY	209	186	198	10	152	242	997
BORROW	102	105	211	9	108	0	535
INCLOSED	672	554	1,122	122	621	0	3,091
Total	983	845	1,531	141	881	242	4,623
Plan 4							
LEVEE RIGHT-OF-WAY	209	186	190	10	78	519	1,192
BORROW	102	51	114	9	53	0	329
INCLOSED	672	554	1,122	122	590	0	3,060
Total	983	791	1,426	141	721	519	4,581
Plan 5							
LEVEE RIGHT-OF-WAY	165	186	237	45	166	217	1,016
BORROW	110	105	284	9	113	0	621
INCLOSED	137	554	773	43	313	0	1,820
Total	412	845	1,994	97	592	217	3,457

NOTE: Refer to Appendix A, Section A 4 (Tables A 4.1 ~ A 4.5) for without project conditions.

^{1/} Agricultural lands enclosed would be a beneficial impact and therefore are not included on this Table.

TABLE 6

POTENTIAL HABITAT LOSSES (ACRES) ATTRIBUTABLE TO CLOVELLY FARM AND
LOUISIANA LAND AND EXPLORATION COMPANY BY PLAN (DATA BASED ON ACRES PRESENT IN 1975)

Plan	Fresh/Intermediate Marsh	Brackish Marsh	Open Water	Wooded Swamp	Bottomland Hardwood	Agricultural Land	Total
Plan 1 (TSP)							
Clovelly	110	0	107	0	0	88	305
LL&E	0	54	105	0	160	129	448
<u>Total</u>	<u>110</u>	<u>54</u>	<u>212</u>	<u>0</u>	<u>160</u>	<u>217</u>	<u>753</u>
Plan 2							
Clovelly	110	0	107	0	0	88	305
LL&E	0	0	0	0	0	406	406
<u>Total</u>	<u>110</u>	<u>0</u>	<u>107</u>	<u>0</u>	<u>0</u>	<u>494</u>	<u>711</u>
Plan 3							
Clovelly	0	0	0	0	0	113	113
LL&E	0	54	105	0	160	129	448
<u>Total</u>	<u>0</u>	<u>54</u>	<u>105</u>	<u>0</u>	<u>160</u>	<u>242</u>	<u>561</u>
Plan 4							
Clovelly	0	0	0	0	0	113	113
LL&E	0	0	0	0	0	406	406
<u>Total</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>519</u>	<u>519</u>
Plan 5							
Clovelly	110	0	107	0	0	88	305
LL&E	0	54	105	0	160	129	448
<u>Total</u>	<u>110</u>	<u>54</u>	<u>212</u>	<u>0</u>	<u>160</u>	<u>217</u>	<u>753</u>

1/ Louisiana Land and Exploration Company

TABLE 7

POTENTIAL HABITAT LOSS BY WORK SECTION ALONG THE MODIFIED GOM ALIGNMENT EXCLUDING
THE FARM SEGMENTS (DATA BASED ON ACRES PRESENT IN 1975)

Habitat Type	Section C North	Section C South (Belle Amt.)	Section F	Section E North	Section E South	Section 1/ Alternate	Section E South	Section D	Section A East
Fresh/Intermediate Marsh									
Levee right-of-way	14	18	70	0	102	51	0	5	
Borrow	6	10	36	0	50	6	0	0	
Inclosed	0	29	0	0	602	16	0	41	
Total	20	57	106	0	754	73	C	46	
Brackish Marsh									
Levee right-of-way	0	5	0	0	0	0	0	0	181
Borrow	0	0	0	0	0	0	0	0	51
Inclosed	0	248	0	0	0	0	0	0	306
Total	0	253	0	0	0	0	0	0	538
Open Water									
Levee right-of-way	0	0	3	0	0	17	0	167	
Borrow	0	0	28	0	0	0	0	0	86
Inclosed	0	377	0	0	365	14	0	0	380
Total	0	377	41	0	375	31	0	0	633
Wooded Swamp									
Levee right-of-way	0	0	3	0	7	42	0	0	0
Borrow	0	0	2	0	7	7	0	0	0
Inclosed	0	0	0	0	122	43	0	0	0
Total	0	0	5	0	136	92	0	0	0
Bottomland Hardwoods									
Levee right-of-way	37	0	0	0	19	33	22	0	
Borrow	15	0	0	0	23	28	15	0	
Inclosed	0	154	0	0	436	128	0	0	
Total	52	154	0	0	478	189	37	0	

1/ E South Alternative Applicable to Plan 5 Only.

marsh or brackish marsh in the study area. Under future without project conditions there would be 21 acres of fresh/intermediate marsh and 353 acres of brackish marsh remaining in the study area (see Table 8). With this plan, there would be a net annualized loss of 215 acres of fresh to intermediate marsh and 607 acres of brackish marsh.

90. During levee construction, runoff from levee material placement would cause increased turbidity levels in adjacent marshes. Elevated turbidity levels would lower the biological productivity of affected marsh habitats by reducing light penetration, which, in turn, would inhibit photosynthesis in aquatic vegetation and phytoplankton. Increased turbidity levels would have a beneficial effect on adjacent marsh habitat by providing needed sediment and nutrients as suspended sediments precipitate out in the marshes.

91. Another major impact would be the disruption of existing hydrologic flow patterns between the study area and adjacent marshes and estuarine open-water areas. This could result in subtle alterations in the makeup, function, and productivity of the plant and animal communities in these adjacent areas.

92. Loss of marsh due to construction and induced drainage would act cumulatively with other ongoing causes of marsh loss to further reduce the marsh acreage in the study area needed to support marsh-dwelling species of fish and wildlife. It would also reduce the biological productivity in adjacent marsh and open-water areas since detrital material produced within the study area forms an important component in the food web of these areas. Production of commercially important finfish and shellfish species accordingly would be expected to decrease as marsh acreage decreases.

93. Plan 2. This plan, modified GDM plus Clovelly Farms, would impact 370 acres of fresh/intermediate marsh and 237 acres of brackish marsh

TABLE 8

COMPARISON OF BASE, FUTURE WITHOUT PROJECT (FW0) AND FUTURE WITH PROJECT (FW)
CONDITIONS IN THE STUDY AREA (ACRES)

Year	Condition	Fresh/ Intermediate Marsh	Brackish/ Marsh	Open/ Water	Wooded Swamp	3/ Bottomland/ Hardwoods	Levee	Agricultural/ Pasture	Residential/ Commercial	Total Acreage Affected
1975	Base ^{1/}	1093	845	1638	141	881	0	0	0	4598
2096	FW0 ^{2/}	21	353	3202	1	165	0	720	137	4598
	Plan ^{3/} PI ^{4/}	0	0	660	0	23	794	2623	498	4598
	HE ^{5/}	0	0	660	0	23	794	2623	498	4598
	Plan ²	0	10	604	0	48	712	2708	517	4598
	PI ³	0	0	454	0	22	712	2596	495	4279
	HE ⁴	0	10	150	0	26	0	112	22	319
	Plan ³	2	11	739	0	23	755	2578	490	4598
	PI	0	0	535	0	23	755	2578	490	4381
	HE ⁵	2	11	204	0	0	0	0	0	217
	Plan ⁴	2	30	673	0	48	673	2663	509	4598
	PI	0	0	329	0	22	673	2551	487	4062
	HE	2	30	344	0	26	0	112	22	536
	Plan ⁵	13	68	1565	0	65	799	1754	334	4598
	PI	0	0	621	0	11	799	1519	290	3240
	HE	13	68	944	0	54	0	235	44	1338

1/ Includes modified GDM alignment and both Clovelly and Louisiana Land and Exploration farm property (agricultural lands not included).

2/ Future without project land (GDM alignment plus both farms).

3/ This type of habitat will be mitigated; other habitat types listed will not be mitigated.

4/ Project impacted habitat.

5/ Habitat excluded from plan levee alignment which undergoes natural change over time.

due to levee and borrow rights-of-way (ROW). Of these marsh losses 59 acres of fresh/intermediate marsh is attributable to inclusion of Clovelly Farms. Approximately 723 acres of fresh/intermediate marsh and 554 acres of brackish marsh would be converted to pasture and residential/commercial due to inclosure by the levee system. Approximately 51 acres of this inclosed marsh is attributable to Clovelly Farms. Other direct and indirect impacts associated with this plan would be comparable to those described in Plan 1. By 2096, there would be a net decrease of 21 acres of fresh/intermediate marsh and 343 acres of brackish marsh in the study area compared to future without project conditions. With this plan, there would be a net annualized loss of about 215 acres of fresh to intermediate marsh and 583 acres of brackish marsh.

94. Plan 3. This plan, modified GDM alignment plus LL&E, would impact 311 acres of fresh/intermediate marsh and 291 acres of brackish marsh due to levee and borrow ROW. Of these marsh losses, 54 acres of brackish marsh is attributable to ROW for LL&E. Approximately 672 acres of fresh/intermediate marsh and 554 acres of brackish marsh would be converted to pasture and residential/commerical due to inclosure of these habitats by the levee system. No marsh acreage lost due to inclosure is attributable to inclusion of LL&E. Other direct and indirect impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 19 acres of fresh/intermediate marsh and 342 acres of brackish marsh in the study area compared to future without project conditions. With this plan, there would be a net annualized loss of about 192 acres of fresh to intermediate marsh and 592 acres of brackish marsh.

95. Plan 4. This plan, modified GDM, would impact 311 acres of fresh/intermediate marsh and 237 acres of brackish marsh by levee and borrow ROW. Nearly 672 acres of fresh/intermediate marsh and 554 acres of brackish marsh would be lost as they become converted to pasture and residential/commercial due to inclosure of these habitats by the levee

system. Other direct and indirect impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 19 acres of fresh/intermediate marsh and 323 acres of brackish marsh in the study area compared to future without project conditions. With this plan, there would be a net annualized loss of about 196 acres of fresh to intermediate marsh and 553 acres of brackish marsh.

96. Plan 5 (LED). With Plan 5, 275 acres of fresh/intermediate marsh and 291 acres of brackish marsh would be lost due to conversion to levee and borrow ROW. Inclusion of Clovelly and LL&E accounts for the loss of 59 acres of fresh/intermediate marsh and 54 acres of brackish marsh lost due to ROW. Due to this plan's realinement of the levee in Section E South, approximately 586 acres of marsh would be excluded from inclosure. Other direct and indirect impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 8 acres of fresh/intermediate marsh and 285 acres of brackish marsh in the study area compared to without project conditions. With this plan, there would be a net annualized loss of about 88 acres of fresh to intermediate marsh and 516 acres of brackish marsh.

WATER BODIES

97. Plan I (RP). Under the RP, 230 acres of open water would be lost due to levee construction and 284 acres would be converted to borrow ROW (see Table 5). Of these totals, inclusion of Clovelly and LL&E farms accounts for 40 and 170 acres respectively of open water lost or modified due to construction activities. The remaining 1,124 acres, of which inclusion of the two farms accounts for 2 acres, would be lost by 1991 due to inclosure by the levee system and subsequent drainage by local interests. By 2096, there would be a net loss of 2,542 acres of open water in the study area compared to the without project conditions.

98. Another impact of levee construction would be the blockage of several major waterways off Bayou Lafourche -- specifically, Breton Canal, Yankee Canal, and Scully Canal. This blockage would occur at the levee alignment, and thereby leave a portion of each waterway (1-2 miles) within the levee alignment navigable between Bayou Lafourche and the levee alignment. The blockage would cease water exchange between Bayou Lafourche and the outlying marshes and water bodies. This would cause a reduction in the volume of freshwater and associated sediments and nutrients to outlying marshes. A no-flow situation would exist in these three canals within the protection levee. Stagnation of these canals is likely to occur, although surface run-off due to storm events, boat traffic, and daily tides would minimize this impact. Blockage of these canals would beneficially block pathways available for floodwaters to enter the area.

99. The major water quality impacts associated with this plan would come from the dredging and placement of fill material. As a result of placement of dredged material along the levee rights-of-way, turbidity in the immediate project vicinity would increase significantly above ambient conditions during construction. Most significant turbidity increases would be expected to occur in the borrow canals adjacent to the levee and at the major waterways crossed by the proposed levee. As the majority of the borrow canals would be located inside the protection levee, and would be blocked during construction with earthen plugs, the transport of suspended sediments to surrounding waterways would be limited.

100. At borrow pits located outside the levee (Clovelly and LL&E Farm alignments) and at the major waterway crossings, elevated turbidity levels could be expected to cause temporary water quality impacts on the aquatic environment through reduced light penetration and the resulting decrease in photosynthetic capabilities, and reductions in dissolved oxygen concentrations. As the subject water environments are relatively quiescent, turbidity impacts would be expected to be spatially limited

and only affect aquatic environments directly associated with construction activities.

101. The most important secondary effects of the subject actions are the habitat modifications of areas used for borrow material. The blockage of hydraulic connections of borrow pits to floodside water bodies would reduce circulation, particularly within the landside pits, which, in turn, would tend to promote tendencies for thermal stratification and occasional oxygen deficiencies at lower depths. These undesirable effects would be offset somewhat by colonization of the expanded and newly created borrow areas by wetland plants and aquatic organisms.

102. The placement of dredged materials in the existing waterways traversing the study area (especially those hydrologically linked to Bayou Lafourche and the open-water bodies to the west of the project) would alter hydraulic flow patterns and free exchange of waters and nutrients throughout the immediate area.

103. Results of elutriate analysis on the proposed dredged sediments revealed a significant potential for various toxic metals and nutrients to become chemically active during the dredging and disposal activities. Based on the elutriate analysis, the affected waterways would be expected to experience chronic and acute water quality impacts. However, standard elutriate tests are not directly applicable to actual water quality impact potentials for the Larose to Golden Meadow Project. The standard elutriate test is designed to simulate the water quality impacts resulting from the open-water disposal of dredged materials from a hydraulic type dredge (worst case analysis). The proposed method of dredging and fill placement in the subject project is bucket-type dredging (dragline) which would result in very little actual slurry mixing during the dredging process. In addition, the majority of actual dredged sediments would consist of undisturbed materials with less probability of contamination. These factors would tend to lessen

the likelihood of resuspending undesirable contaminants. However, it is probable that EPA chronic criteria for various toxic metals would be exceeded at areas in the waterway directly affected by the dredging. Based on EPA chronic and acute criteria for freshwater and marine life, there would be perhaps a 50% probability of adverse impacts to aquatic organisms. However, any such impacts would be expected to be localized and affect only water bodies within the immediate vicinity of the construction activities.

104. Plan 2. This plan would impact 222 acres of open water by conversion to levee, and 187 acres would be deepened to become borrow ROW. Of these totals, inclusion of Clovelly farms would account for loss of 32 and 73 acres respectively to levee and borrow. The remaining 1,124 acres, of which 2 acres is attributable to Clovelly, would be lost due to inclosure and drainage of water bodies within the levee system. Other construction related direct and indirect impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 2,598 acres of water bodies compared to without project conditions.

105. Water quality impacts would be slightly less than those described in Plan 1 since LL&E property would not be leveed.

106. Plan 3. This plan would impact 198 acres of open water which would be lost due to levee construction and 211 which would be deepened for borrow ROW. Of these totals, 8 acres and 97 acres respectively, are attributable to inclusion of LL&E. Approximately 1,122 acres of water bodies would be lost due to their inclosure and subsequent drainage within the levee system. None of the acreage inclosed by the levee system is attributable to inclusion of LL&E. Other impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 2,463 acres of open water in the study area compared to without project conditions.

quality in Lafourche Parish is better than the national standards for all parameters except ozone, it is doubtful that air quality impacts associated with this plan would result in air quality standard violations.

160. Plan 2. Impacts would be comparable to Plan 1.

161. Plan 3. Impacts would be comparable to Plan 1.

162. Plan 4. Impacts would be comparable to Plan 1.

163. Plan 5. Impacts would be comparable to Plan 1.

NOISE

164. Plan 1 (RP). Noise impacts associated with the RP would be minor. The levee alignment, except where the levee meets the floodwalls near the towns of Larose and Golden Meadow, would occur in isolated marsh areas. Levee and floodwall construction near populated areas temporarily would increase local noise levels, and residents in close proximity to construction sites could consider noise levels as unacceptable during working hours. However, ambient noise levels would return to normal upon completion of the project.

165. Plan 2. Same as Plan 1.

166. Plan 3. Same as Plan 1.

167. Plan 4. Same as Plan 1.

168. Plan 5. Same as Plan 1.

56. Plan 3. With this plan, annual hunting man-days would be reduced by the year 2096 from 2,449 to 469, valued at \$1,997. When compared with the future without project, this plan, by the year 2096, would reflect an increase of 1,380 annual man-days but would incur an annual loss of \$1,585 as a result of impacts similar to those discussed under Plan 1.

57. Plan 4. With this plan, annual hunting man-days would be reduced by the year 2096 from 2,433 to 502 valued at \$2,217. When compared with the future without project, this plan, by the year 2096, would reflect a decrease of 42 annual man-days but would incur an annual loss of \$1,365 as a result of impacts similar to those discussed under Plan 1.

58. Plan 5. With this plan, annual hunting man-days would be reduced by the year 2096 from 2,436 to 341, valued at \$1,902. When compared with the future without project, this plan, by the year 2096, would reflect a decrease of 79 acres of man-days valued at \$1,680. Although this plan is the least environmentally damaging in terms of overall habitat acres that would be impacted by the project, recreational man-day losses would be greater because of the reduced acres of pastureland that would be created under this alternative. It is this habitat type which provides the greatest amount of recreational potential for small game hunting when leveed wetlands are converted to pasturelands. Other impacts of this plan are similar to those of Plan 1.

AIR QUALITY

59. Plan 1 (RP). Construction impacts would include the introduction of particulate matter (dust) to the air from excavation and placement of fill material as well as gaseous and particulate matter from vehicles and construction equipment. Gaseous substances would include carbon monoxide, nitrous and sulfurous oxides, and photochemical oxidants. Air quality in the study area would decline slightly due to project induced commercial and agricultural development. Since air

153. Plan 5. This plan would have the same potential impacts as Plan 1.

RECREATION

154. Plan 1, as in the NY, annual hunting man-days of supply would be reduced by the year 2096 from 2,439 to 466, valued at \$1,922. This value reflects a monetary loss of \$21,689 by the end of project life compared to the no-project (see Appendix A, Natural Resource Appendix, Section V, Recreational Resources Table A.7.2 for a summary of the recreational man-day analysis for all plan alternatives). However, when compared with the future without project, this plan would reflect an overall specific gain of 6 recreational man-days but a monetary annual loss of \$1,669 by the year 2096. This is attributable to substantial losses in marsh and forest habitat which would reduce waterfowl and deer game hunting potential of a more specialized and higher rated recreation per-day value, as opposed to small game hunting. Small game hunting losses are not as great, because the conversion of levee-enclosed marshes to substantial acres of pasture would provide suitable habitat for small game species and sustain this activity. Remaining wetlands that would become enclosed by the project would have hunting potential reduced by as much as two thirds. The blockage of three major canals would deny access to outlying marsh areas by hunters and fishers. However, the boat launching facilities (ramps) to be constructed at Yankee Canal, Bully Camp Canal, and as yet one unknown location in the town of Golden Meadow would restore hunting and fishing access.

155. Plan 1, as in the NY, annual hunting man-days would be reduced by the year 2096 from 2,439 to 492 man-days per year, valued at \$2,081 annually. When compared with the future without project, this plan would reflect a gain of 32 annual man-days overall but would incur an annual loss of \$4,651 resulting from the remaining man-days of small game hunting available on levee-enclosed pastures. Other impacts of this plan on recreation are similar to those of Plan 1.

145. Plan 3. Same as Plan 1.

146. Plan 4. Same as Plan 2.

147. Plan 5. Same as Plan 1.

CULTURAL RESOURCES

148. Cultural resource investigations are continuing on this project (see Appendix A, Section A.6, Table A.6.1). Site-specific project impacts will be determined, and, if necessary, determinations of National Register eligibility will be requested. Potential project impacts and known cultural resources are discussed below.

149. Plan 1 (RP). One National Register-eligible property, the M/V Fox, will be adversely affected by this plan. The M/V Fox is an historic passenger boat located in the impact area of the Larose Floodgate. A Memorandum of Agreement (MOA) stipulating mitigation measures for this impact and defining compliance procedures for the remaining portions of the project has been completed. A copy of the MOA is included in Appendix A, Section A.6. No other significant cultural resources are presently known to be impacted by this plan. Archeological sites 16LF1, 16LF57, 16LF58, 16LF59, 16LF60, 16LF61, 16LF62, 16LF63, 16LF88 are located near construction areas and will be protected during construction.

150. Plan 2. This plan would have the same potential impacts as Plan 1.

151. Plan 3. This plan would have the same potential impacts as Plan 1.

152. Plan 4. This plan would have the same potential impacts as Plan 1.

NATIONAL AUDUBON BLUE LIST SPECIES

138. Plan 1 (RP). Blue List species could be impacted due to the habitat loss from levee and borrow construction and induced drainage of inclosed wetlands. Marsh loss could adversely impact the bitterns, king rail, and long-billed curlew. The forest loss could impact the hairy woodpecker, and eastern bluebird. Loss of any of these habitats could impact predators such as the owls and hawks, and scavengers such as black vultures. On the other hand, the resultant pastureland from the induced wetland drainage could benefit such species as eastern meadowlark, loggerhead shrike, grasshopper sparrow, and dickcissel.

139. Plan 2. Similar to Plan 1.

140. Plan 3. Similar to Plan 1.

141. Plan 4. Similar to Plan 1.

142. Plan 5. Since the amount of marsh loss associated with this plan would be less, impacts to Blue List species would be minimized.

WATERBIRD NESTING COLONIES

143. Plan 1 (RP). The waterbird nesting colony at the southeast edge of LL&E property could be adversely impacted by the levee construction. Birds could be frightened by the close proximity of men and equipment. However, floodside borrow would alleviate some of the problem. Work on this reach should be restricted to August through February when there would be no young in the nests, so impacts would be minimized.

144. Plan 2. This alternative would have no impact upon the nesting colony, due to the exclusion of LL&E property from this levee alignment.

both LL&E and Clovelly Farms from the levee alinement. This exclusion accounts for the remaining potential fishery harvest (22,976 lbs.) by the year 2096. Under this plan, 329 acres of natural habitat would be converted to deep-water aquatic habitat. This aquatic habitat, although of lower habitat quality, would provide some useable aquatic habitat. All other impacts would be similar to those described in Plan 1.

132. Plan 5. A net loss of 2,031 acres of potential fishery habitat would occur by 2096 compared to without project conditions. By 2096, annual fishery production contributed by the study area would be 58,158 pounds and valued at \$14,539 dollars. This plan excludes approximately 681 acres of fresh/intermediate marsh from the levee alinement due to a levee realinement in Section E South. This exclusion accounts for the remaining potential fishery harvest (58,158 lbs) by the year 2096. Under this plan, a total of 621 acres of natural habitat would be converted to deep-water borrow habitat. All other impacts would be similar to those described in Plan 1.

ENDANGERED AND THREATENED SPECIES

133. Plan 1 (RP). Construction activities associated with this plan would not directly impact any endangered or threatened species nor their critical habitat (see Appendix A, Section A.2).

134. Plan 2. Same as Plan 1.

135. Plan 3. Same as Plan 1.

136. Plan 4. Same as Plan 1.

137. Plan 5. Same as Plan 1.

larval fish, post larval and juvenile shrimp, and other young aquatic organisms could be adverse. This would be because young organisms are not very mobile, and sudden turbidity increases could clog respiratory and feeding structures causing the organism to become stressed and possibly die, if adverse conditions persist long enough.

129. Plan 2. A net loss of 3,080 acres of potential fishery habitat would occur due to levee and borrow ROW with this plan by 2096. Potential net annual fishery production (year 2096) contributed by the study area would be 7,180 pounds and valued at \$1,795 dollars. This plan excludes LL&E from the levee alignment. This exclusion accounts for the potential fishery harvest (7,180 lbs.) in the year 2096 (see Table A.3.2). Under this plan, a total of 454 acres of deep-water habitat would be created. This deep-water habitat, although considerably less productive than the marshes it replaced, would provide some useable aquatic habitat. All other impacts would be comparable to those described in Plan 1.

130. Plan 3. A net loss of 2,967 acres of potential fishery habitat would be lost due to construction or modified with this plan, compared to without project conditions. By the year 2096, annual fishery production in the study area would be reduced to 9,347 pounds valued at \$2,333 dollars. This plan excludes Clovelly Farms from the levee alignment. This exclusion accounts for the remaining potential fishery harvest (9,347 lbs) in the year 2096. Under this plan, a total of 535 acres of natural habitat would be converted to deep water borrow pit habitat. All other impacts would be similar to those described in Plan 1.

131. Plan 4. Implementation of this plan would result in the net loss and/or modification of approximately 2,989 acres of potential fishery habitat by 2096, compared to without project conditions. By the year 2096, annual fishery production contributed by the study area would be reduced to 22,976 pounds valued at \$5,744 dollars. This plan excludes

127. The impacts during construction include burial of benthic organisms and slow-moving fish species in the marsh and open-water areas of the levee ROW. Benthic organisms would also be destroyed in the borrow ROW, but a new benthic community would establish in the bottom sediment of the borrow canals. Most fish species would escape burial where the levee material is placed in water bodies which have escape routes, such as the canals. Impacts after construction include blocking access to the outlying marshes for the fish inside the levee system. Crowding, competition for food, and eventual death would occur among the fish trapped inside isolated marsh areas within the levee system as these areas are drained. Burial of benthic organisms would be a loss of food items for those fish-species which feed upon them. Loss of marsh and forest habitat would decrease the amount of detritus and nutrients that these areas could contribute to the local coastal estuarine system compared to what would be contributed without the levee system.

128. Levee raising activities would result in a temporary increase in turbidity levels of adjacent marsh and open-water habitat. This increase in turbidity would have several negative impacts. First, by reducing light penetration, it would inhibit photosynthesis in aquatic vegetation and phytoplankton, thereby reducing primary productivity. Secondly, laboratory studies by Lackey et al. (1959) have demonstrated that certain types of sediments, specifically clay, sand, and mud, are capable of removing up to 99 percent of planktonic algae in a relatively short period of time (20 minutes). Plankton apparently adhere to the suspended sediments and are precipitated to the bottom. Also, these sediments absorb certain critical nutrients (especially phosphorous) which photosynthetic organisms need to survive. Finally, the abrasiveness of the suspended sediments can physically destroy phytoplankton. These impacts would be short term and primary productivity levels should return to normal when construction activities cease. Turbidity impacts to local juvenile and adult fish communities in the adjacent affected areas would be negligible due to their ability to vacate the area until more favorable conditions exist. Impacts to

FISHERIES

125. Plan 1 (RP). Under this plan, a net loss of 3,059 acres of potential fishery habitat (marsh, open water, and flooded forest) would occur by 2096. This loss of aquatic habitat would result in a significant decrease in the fishery production attributed to the study area. Estimated fishery production over the life of the project is presented in Table A.3.2 (refer to Appendix A, Section A.3, for fishery methodology). These estimates included fishery production associated with the marsh found in the study area, since most commercially and recreationally important estuarine fish species are dependent on these marshes at some stage in the life cycle. For without project conditions in 2096, it is estimated that fishery production attributed to the study area would be 268,532 pounds and valued at \$67,133 dollars. With implementation of this plan, the predicted fishery harvest in 2096 attributed to the study area which includes both farms would be zero.

126. A total of 660 acres would be converted to deep-water borrow habitat. Chambers (1980) compared the number of fish and fish species which occurred in marsh bayous and lakes with depths greater than 2.5 meters to those shallow-marsh bayous and ponds with depths between 0.5 and 2.8 meters. He found that the small, shallow-water bodies had greater catches of both estuarine and freshwater species and greater number of species than the adjacent deeper-water bodies. Thus, should the borrow canals remain after levee construction, they would not provide habitat for those fish species which prefer the existing shallow marsh-water bodies. They would, however, provide habitat for different species. Protected side borrow canals would be inaccessible to estuarine fish species, but would provide habitat for some freshwater species. Floodside borrow canals would attract those estuarine species which prefer deep (-30 feet) water.

Rodents, rabbits, and birds would use this habitat for resting, escape cover, and food. Other wildlife species would use the levee for resting and escape from floodwaters. The borrow areas probably would be frequented by alligators. Waterfowl would rest here, especially when water is low in the adjacent marshes.

121. Plan 2. By 2096, there would be a net loss of 482 acres of marsh and forest and 2,598 acres of open water and a net gain of 2,700 acres of levee/pasture in the study area compared to without project conditions. Other project related impacts associated with this plan would be similar to those described in Plan 1; however, slightly less wildlife habitat would be directly impacted, since this plan does not include LL&E within the levee alignment.

122. Plan 3. A net of 504 acres of marsh and forest and 2,463 acres of open water would be lost by 2096, compared to future without project conditions and a net gain of 2,613 acres of levee/pasture would occur. Other project related impacts would be similar to those described in Plan 1; however, slightly less wildlife habitat would be impacted since this plan does not include Clovelly Farms within the levee alignment.

123. Plan 4. A net loss of 460 acres of marsh and forest and 2,529 acres of open water would occur by 2096, and there would be a net gain of 2,616 acres of levee/pasture. Other direct and indirect impacts associated with this plan would be comparable to those described in Plan 1; however, less wildlife habitat would be impacted, since this plan does not include either farm within the levee alignment.

124. Plan 5. A net loss of 394 acres of marsh and forest and 1,637 acres of open water and a net gain of 1,833 acres of levee/pasture would occur by 2096. Other project related impacts associated with this plan would be comparable to those described in Plan 1, except this plan would have the least impact on wildlife since the smallest amount of habitat would be impacted due to levee realinement in Section E South.

compared to without project conditions. With this plan, there would be a net average annualized loss of 13 acres of wooded swamp and 181 acres of bottomland hardwoods.

WILDLIFE

118. Plan 1 (RP). By 2096, there would be a net loss of 517 acres of marsh and forest and 2,542 acres of open water in the study area and a gain of 2,697 acres of levee/pasture (see Table 7).

119. The direct impacts on wildlife by the levee construction include burial, loss of habitat, and gain of marginal habitat. Less mobile wildlife species would be buried during levee construction. The more mobile species would escape, but adjacent areas could become overcrowded, and some mortality could occur. Access to outlying marshes would be blocked for those animals unable to traverse the levee. Induced drainage of inclosed areas would cause the marsh and open-water habitat to disappear and become pasture or cropland. The number and kinds of water and marsh dwelling wildlife would decrease significantly in the study area. The forest habitat would dry out and some would be grazed, but most would be cleared. The areas of new habitat would be less valuable to wildlife than the original natural habitat. The pastures and croplands would attract a variety of nongame and game wildlife, such as seedeating and insectivorous birds, cottontail rabbits, armadillos, rice rats, red-tailed hawks, and barn owls. The drained wooded swamp forest would not attract deer because of the likelihood of cattle grazing which would clear out vegetation attractive to deer. However, these forests would attract some game species and many nongame wildlife species, such as gray and fox squirrels, mourning dove, mice, cardinals, crows, vultures, woodpeckers, hawks, and owls.

120. Two new habitats that would be created by project construction are levee and borrow pits. The new levees would become vegetated with grasses and small shrubs and have a wildlife value similar to pasture.

115. Plan 3. This plan would directly impact 19 acres of wooded swamp and 260 acres of bottomland hardwoods, and indirectly impact 743 acres of forest. Of these totals, 160 acres of bottomland hardwoods lost due to direct or indirect impacts, are attributable to inclusion of LL&E with this plan. Secondary impacts associated with this plan would be the same as those described in Plan 1. By 2096, there would be no wooded swamp in the study area with or without the project. By the same year there would be a net decrease of 142 acres of bottomland hardwoods compared to without project conditions. With this plan, there would be a net average annualize loss of 12 acres of wooded swamp and 214 acres of bottomland hardwoods.

116. Plan 4. This plan would directly impact 19 acres of wooded swamp and 131 acres of bottomland hardwoods and indirectly impact a total of 712 acres of forest. Secondary impacts would be the same as described in Plan 1. Again, there would be no wooded swamp in the study area by 2096, with or without the project. By 2096, there would be a net decrease of 117 acres of bottomland hardwoods compared to without project conditions. None of the wooded swamp or forest acreage lost due to implementation of this plan is attributable to the farms, since this plan does not include either farm. With this plan, there would be a net average annualized loss of 12 acres of wooded swamp and 153 acres of bottomland hardwood.

117. Plan 5. Under the LED plan, 54 acres of wooded swamp and 279 acres of bottomland hardwood forest would become levee or borrow. The number of acres of both forest types which would be inclosed by the Section E South alternate alinement is 387 acres less than the number of acres inclosed by the RP (743 acres). The amount of forest lost due to inclusion of the farms would be the same as Plan 1. Secondary impacts associated with this plan would be comparable to those described in Plan 1. By 2096, no wooded swamp would remain in the study area, and there would be a net decrease of 100 acres of bottomland hardwoods

hardwoods would be inclosed and subsequently drained and/or cleared. Approximately 31 acres of bottomland hardwoods lost due to inclosure are attributable to inclusion of the farms. By 2096, there would be essentially no wooded swamp in the study area, with or without the project. There would be a net decrease of 142 acres of bottomland hardwoods by 2096 compared to without project conditions. With this plan, there would be a net average annualized loss of 12 acres of wooded swamp and 214 acres of bottomland hardwoods.

113. Drainage would cause the wooded swamps to succeed to bottomland hardwood forest populated by more dry-tolerant tree species. Clearing would eventually occur. Restriction of floodwaters to these forests would slow plant growth due to the loss of water and overflow nutrient input (Klimas et al. 1981). This drainage would cause a loss of some benthic and fishery habitat. Fish and crawfish production would be decreased. The inclosure and drainage of forested wetlands would cause a loss of a source of detritus and nutrients which could contribute to adjacent wetlands.

114. Plan 2. Approximately 19 acres of wooded swamp and 131 acres of bottomland hardwoods would be lost due to levee and borrow ROW. A maximum of 712 acres of forest would be impacted due to inclosure and clearing of these forests as previously described in Plan 1. Of the wooded swamp and bottomland hardwood lost due to implementation of this plan, none is attributable to inclusion of Clovelly Farms. There would be essentially no swamp in the study area by 2096 with or without the project. There would be a net decrease of 117 acres of bottomland hardwoods compared to without project conditions. With this plan, there would be a net average annualized loss of 12 acres of wooded swamp and 153 acres of bottomland hardwoods. Secondary impacts would be the same as described in Plan 1.

107. Water quality impacts would be slightly less than those described in Plan 1, since Clovelly Farms would not be leveed.

108. Plan 4. Approximately 190 acres of open water would be lost due to levee construction and 114 acres would become borrow ROW. The remaining 1,122 acres would be lost due to the inclosure and drainage within the levee system. Other project related impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 2,529 acres of open water compared to without project conditions.

109. Water quality impacts would be less than those described in Plan 1 since neither LL&E or Clovely Farms would be leveed.

110. Plan 5. Approximately 237 acres would be lost due to levee construction and 284 acres would be deepened for borrow ROW; habitat inclosure would impact 773 acres. Open-water acreage lost due to levee and borrow ROW, and inclosure as a result of inclusion of two farms is the same as Plan 1. Other project related impacts associated with this plan would be similar to those described in Plan 1. By 2096, there would be a net decrease of 1,637 acres compared to without project conditions.

111. Water quality impacts would be similar to those described in Plan 1.

FORESTS

112. Plan 1 (RP). Nearly 19 acres of wooded swamp and 260 acres of bottomland hardwoods would be lost due to levee construction and borrow ROW. Of these totals, inclusion of the two farms would account for 129 acres of bottomland hardwoods lost due to levee and borrow ROW. Approximately 122 acres of wooded swamp and 621 acres of bottomland

AGRICULTURAL/PASTURELANDS (INCLUDING PRIME AND UNIQUE)

169. Plan 1 (RP). The construction of this plan would eliminate 217 acres of agricultural land due to levee right-of-way. Of this total, 88 acres (57 agricultural, 31 low levee) would occur on Clovelly farm property and 129 acres (103 agricultural/pasture, 26 low levee) would occur on LL&E farm property. About 70 acres of crawfish ponds and 60 acres of sugarcane/soybeans would be impacted; these areas are classified as unique farmlands. No other agricultural/ pasturelands occur along the levee alignment. Completion of the levee would protect 5,547 acres of agricultural/pasturelands within the two farm properties (2,330 acres Clovelly Farm; 3,167 acres LL&E farm).

170. Plan 2. This plan would eliminate 494 acres of agricultural/ pasturelands due to levee right-of-way. Of this total, 88 acres of agricultural/pasturelands would be lost due to inclusion of Clovelly farms within the levee alignment. The remaining 406 acres of agricultural/pasturelands lost due to levee right-of-way would occur along the western boundary of LL&E property which shares a common boundary line with the GDM levee alignment (see Plate 7). Excluding LL&E property would impact two times more agricultural/pasturelands than Plan 1 which included LL&E within the alignment. Completion of this plan would protect 2,380 acres of agricultural/pasturelands within the Clovelly farm property. Exclusion of LL&E property from the protection levee alignment would continue to subject this property to potential hurricane storm damage.

171. Plan 3. Construction of this plan would eliminate 242 acres of agricultural/pasturelands due to levee right-of-way. Of this total, 129 acres of LL&E agricultural/pasturelands would be lost due to inclusion of this farm in the levee alignment. The exclusion of Clovelly farms from the levee alignment accounts for the remaining loss of 113 acres of agricultural/pasturelands. Like Plan 1, inclusion of LL&E property would protect a total of 3,167 acres of agricultural/ pastureland.

Exclusion of Clovelly farm would continue to subject the remaining 2,355 acres to potential hurricane storm events.

172. Plan 4. Implementation of this plan which excludes both farm properties would eliminate 519 acres of agricultural/pasturelands due to levee right-of-way. Of this total, 113 acres would occur on Clovelly farm property and 406 acres of LL&E agricultural/pastureland would be eliminated due to construction impacts. Exclusion of both farm properties would impact more than twice as much farm property as Plan 1 which includes both farm properties. In addition, the remaining 5,245 acres associated with the two farms would continue to be subjected to hurricane flood damage since these properties would lie outside the levee alinement.

173. Plan 5. Same as Plan 1.

COMMUNITY COHESION

174. Plan 1 (RP). With this plan, community cohesion would be favorably affected as a result of the alinement in the community of Larose, Louisiana. Plan 1 would alter the originally authorized plan such that the alinement would run immediately along the right east-bound bank of the Gulf Intracoastal Waterway for the length of the developed area of Larose, Louisiana. The originally authorized plan included an alinement basically parallel to this revised alinement, but a short distance from the waterway's bank. The revised alinement with Plan 1 would incorporate approximately 50 additional acres within the protected area. This would provide flood protection to some 160 residential structures and several commercial establishments. Inclusion of this area would prevent a sense of isolation that might develop with the residents that would otherwise be left unprotected with the originally authorized plan. The revised alinement, however, could require the relocation of up to approximately eight residences for construction rights-of-way. The alinements of Plan 1 in the Larose, Louisiana, area

would also favorably affect community cohesion in another way. By moving the alignment to the bank of the Gulf Intracoastal Waterway, the relocation of a cemetery that would be required with the originally authorized alignment would be avoided. By preventing this disruption, community cohesion would be favorably affected.

175. Plan 2. The impacts of Plan 2 on community cohesion would be very similar to those associated with Plan 1. The only difference between these two plans would be the elimination of the LL&E area from the protected area with Plan 2. The impact of this exclusion on community cohesion would be limited to the adverse impacts of physical flood damages to the development within the LL&E area, as there are no permanent residences located within LL&E.

176. Plan 3. The impacts of Plan 3 on community cohesion would be very similar to those associated with Plan 1. The only difference between these two plans would be the elimination of Clovelly Farms from the protected area with Plan 3. The impact of this exclusion on community cohesion would be limited to the adverse impacts of physical flood damages to the development within Clovelly Farms, as there are no permanent residences located within Clovelly Farms.

177. Plan 4. The impacts of Plan 4 on community cohesion would be similar to those associated with Plan 1. The difference between these two plans would be the elimination of Clovelly Farms and the LL&E area from the protected area with Plan 4. The impact of these exclusions on community cohesion would be limited to the adverse impacts of physical flood damages to the development within Clovelly Farms and LL&E, as there are no permanent residences within Clovelly Farms or the LL&E area.

178. Plan 5. The impacts of Plan 5 on community cohesion would be the same as those associated with Plan 1.

COMMUNITY GROWTH

179. Plan 1 (RP). Growth in project area population associated with Plan 1 would be the same as with the no action condition. Virtually all available land in the affected portion of Larose has already been developed. Clovelly Farms and the LL&E area are not expected to substantially change land use or the nature of their operations with plan implementation.

180. Plan 2. Same as Plan 1.

181. Plan 3. Same as Plan 1.

182. Plan 4. Same as Plan 1.

183. Plan 5. Same as Plan 1.

BUSINESS AND INDUSTRIAL ACTIVITY AND REGIONAL GROWTH

184. Plan 1 (RP). The protection from flooding that would be provided by Plan 1 would potentially allow for project-induced commercial development in Clovelly Farms and the LL&E area. However, economic study indicates that Clovelly Farms probably would not be altered with the advent of flood protection. Similarly, it is anticipated that the most dramatic change in economic activity likely to occur in the LL&E area with flood protection would be the conversion of pasture to row crop agriculture. There would be no impact on the portion of Larose afforded protection because this area has already developed to its maximum extent. The impact of such a conversion on business and industrial activity and regional growth would not be very significant.

185. Plan 2. The impacts of Plan 2 on business and industrial activity and regional growth would be the same as those expected with Plan 1.

Plan 2, unlike Plan 1, would not protect the LL&E area, and, therefore, not create any project induced incentive for commercial or residential development in this area.

186. Plan 3. The impacts of Plan 3 on business and industrial activity and regional growth would be the same as those expected with Plan 1. Plan 3 would not protect Clovelly Farms as would Plan 1; however, economic activity or land use at Clovelly Farms probably would not be altered with the advent of flood protection. Therefore, there would be no difference in impacts on business and industrial activity and regional growth between Plan 1 and Plan 3.

187. Plan 4. Same as Plan 1, however, there would be no potential to induce development in Clovelly Farms or LL&E.

188. Plan 5. Essentially similar to Plan 1.

LOCAL GOVERNMENTAL FINANCE, TAX REVENUES, AND PROPERTY VALUES

189. Plan 1 (RP). There probably would be an increase in protected area property values as a result of the significant degree of flood protection associated with project construction. The magnitude of this potential impact would be limited as the number of acres protected would be small relative to the tax base. There could also be a favorable effect on sales tax revenue as project construction would tend to stimulate commercial activity and reduce flooding related business disruptions. Adverse impacts would be limited to the negative effect of construction and maintenance costs on local governmental finances.

190. Plan 2. Same as Plan 1.

191. Plan 3. Same as Plan 1.

192. Plan 4. Same as Plan 1.

193. Plan 5. Same as Plan 1.

EMPLOYMENT AND LABOR FORCE

194. Plan 1 (RP). The flood protection provided by project construction would prevent the damages and much of the disruption associated with tidal flooding in the study area. In so doing, employment in all sectors of the local economy would benefit. There would be fewer lost working days and lost wages. Project implementation would also generate a short-term beneficial impact on construction sector employment during project construction.

195. Plan 2. Same as Plan 1, except that Plan 2 would not prevent the disruption and lost working days associated with flooding for LL&E area workers.

196. Plan 3. Same as Plan 1, except that Plan 3 would not prevent the disruption and lost working days associated with flooding for Clovelly Farm area workers.

197. Plan 4. Same as Plan 1, except that Plan 4 would not prevent the disruption and lost working days associated with flooding for Clovelly Farms and LL&E area workers.

198. Plan 5. Same as Plan I.

LIST OF PREPARERS

NAME	DISCIPLINE/EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Mr. Gregory J. Martinez	Fishery Biologist	3 yrs. Planner/Regulatory Functions Nashville District, Corps of Engineers; 2 1/2 Years EIS Studies, Corps of Engineers, New Orleans District	EIS Coordinator, Effects on Fish and Wildlife.
Ms. Monica Farris	Fishery Biologist/ Benthic Ecology	2 1/2 years Marine Biologist Sanitation District of Orange County, CA.; 2 yrs. EIS Studies, New Orleans District, Corps of Engineers	Effects on Fish and Wildlife
Mr. Jeffrey S. Heaton	Oceanographer/Water Quality	3 yrs. Oceanographer, Naval Oceanographic Office, Bay St. Louis, MS; 2 1/2 years Water Quality Section, Corps of Engineers, New Orleans District.	Effects on Water Quality
Mr. Thomas Ryan	Archeologist/ Archeology	5 yrs. Archeologist, New Orleans District Corps of Engineers	Effects on Cultural Resources
Mr. Theodore Hokkanen	Recreation Resource Management/Outdoor Recreation Planner	5 1/2 yrs. Chief Park Ranger, PA. Bureau of State Parks; 4yrs. Chief Resource Ranger, Vicksburg District, Corps of Engineers; 4yrs. Outdoor Recreation Planning, New Orleans District Corps of Engineers	Effects on Recreation Resources
Mr. Richard Manguno	Economics	6 yrs. Economic Studies New Orleans District, Corps of Engineers	Socioeconomic Effects

LIST OF PREPARERS (Continued)

NAME	DISCIPLINE/EXPERTISE	EXPERIENCE	ROLE IN PREPARING EIS
Ms. Suzanne Hawes	Marsh Ecology	1 yr. Lab Associate, LSU Medical School; 12 yrs. Environmental Studies, New Orleans District, Corps of Engineers	Technical Review
Mr. Henry P. Glaviano	English/Technical Writing and Editing	4 yrs. Technical Writer/Editor, The Boeing Company; 12 yrs. Technical Writer/Editor, New Orleans District, Corps of Engineers.	Review and Editorial Assistance
Mr. E. Scott Clark	Wildlife Biologist	4 yrs. Environmental Studies New Orleans District, Corps of Engineers	Final EIS Coordinator

PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT PROGRAM

199. Other than the original public hearing (15 March 1956) held by the New Orleans District (NOD) to determine local interest or opposition to this project, no Corps of Engineers public meetings have been held since that time. However, during the restudy, a number of informal meetings with the South Lafourche Levee District, USFWS, NMFS, and Louisiana Department of Wildlife and Fisheries have been held to fully coordinate this study with all interested parties. On 2 September 1982, NOD met with the above mentioned agencies, with the exception of NMFS who were contacted but elected not to attend, and presented a proposed mitigation plan. Response to a mitigation plan was favorable, with the South Lafourche Levee District unanimously adopting the plan on 11 October 1982, and unanimously passing a resolution on 11 July 1983 agreeing to cost share a mitigation plan 70/30. Because the state has already instituted some of the mitigative measures, the proposed mitigation plan presented requires reevaluation, and this will be coordinated with those agencies.

REQUIRED COORDINATION

200. The Draft Supplemental Environmental Impact Statement (DSEIS) was furnished to Federal agencies, state agencies, and other interested parties for their review in 1984. Circulation of this report accomplished the remaining required coordination with the National Park Service (NPS) and State Historic Preservation Officer (SHPO) as provided under the National Historic Preservation Act; and the NPS as provided under the Federal Water Project Recreation Act.

STATEMENT RECIPIENTS

201. Federal and state agencies and others listed below received copies of the DSEIS, and the appendixes.

FEDERAL REPRESENTATIVES

Honorable J. Bennett Johnson, US Senator
Honorable Russell B. Long, US Senator
Honorable W.J. "Billy" Tauzin, US Congressman

FEDERAL AGENCIES

Department of the Interior, Office of Environmental Project Review
US Environmental Protection Agency, Regional EIS Coordinator,
Region VI
US Environmental Protection Agency, the Administrator
US Department of Commerce, Joyce M. Wood, Director, Office of Ecology
and Conservation
US Department of Commerce, National Oceanic & Atmospheric
Administration National Marine Fisheries Service, Southeast Region
National Marine Fisheries Service, Mr. Donald Moore, Environmental
Assessment Branch
US Department of Agriculture, Washington, D.C.
US Department of Agriculture, Southern Region, Regional Forester,
Forest Service
US Department of Energy, Director, Office of Environmental Compliance,
Washington, D.C.
Federal Emergency Management Administration, Washington, D.C.
Soil Conservation Service, Harry S. Rucker, State Conservationist
US Department of Transportation, Deputy Director for Environmental and
Policy Review
Federal Highway Administration, Division Administrator
US Department of Health and Human Services, Washington, D.C.
US Department of Housing and Urban Development, Regional
Administrator, Region VI
Advisory Council on Historic Preservation, Washington, D.C.
Advisory Council on Historic Preservation, Golden, CO

STATE AGENCIES

Louisiana Department of Health and Human Resources, Office of Health Services and Environmental Quality

Louisiana Department of Transportation and Development Office of Public Works, Assistant Secretary

Louisiana Department of Highways, Mr. Vincent Pizzolato, Public Hearings and Environmental Impact Engineer

Louisiana Department of Wildlife & Fisheries, Mr. Maurice B. Watson, Ecological Studies Section

Louisiana Department of Wildlife & Fisheries, Secretary

Louisiana Transportation of Natural Resources, Office of Environmental Affairs, Water Pollution Control Division

Louisiana Department of Natural Resources, Division of State Lands, P.O. Box 44396

Louisiana Department of Commerce, Research Division, Mrs. Nancy P. Jensen

Louisiana Department of Culture, Recreation, and Tourism, State Historic Preservation Officer

Louisiana Department of Culture, Recreation, and Tourism, Office of State Parks

Louisiana Department of Natural Resources, Office of Environmental Affairs, P.O. Box 44066

Louisiana Department of Natural Resources, Office of Forestry

Louisiana State Planning Office, Ms. Joy Bartholomew, Policy Planner

Louisiana State University, Center for Wetland Resources, Dr. Jack R. Van Lopik

Louisiana State University, Department of Geography and Anthropology, Curator of Anthropology

Louisiana State University, Coastal Studies Institute, Library

Department of Natural Resources, Division of State Lands, P.O. Box 44214

Governors Coastal Protection Task Force, Gerald Bordelon

ENVIRONMENTAL

Ecology Center of Louisiana, Inc., J. Vincent, President

Orleans Audubon Society, Mr. Barry Kohl

Environmental Defense Fund
Mr. Oliver Houck, Tulane Law School

OTHERS

President, Lafourche Parish Police Jury
Teche Regional Clearinghouse, Thibodeaux, Louisiana
South Lafourche Levee District, Galliano, Louisiana

LIBRARIES

Nicholls State University
Lafourche Parish Library

PUBLIC VIEWS AND RESPONSES

202. Modifications to the GDM alignment were in response to local requests for consideration of inclusion of several tracts of land into the levee system. Public responses to the DSEIS have been incorporated into this final Supplemental EIS.

203. Letters of Comment pertaining to the Drafts EIS were received from the following agencies, and are printed along with appropriate responses on the pages listed below. No issues were presented in these letters which would require new alternatives or modifications of the proposed action.

FEDERAL

US Environmental Protection Agency	EIS-86
US Department of the Interior, Office of Environmental Protection Review	EIS-87
US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	EIS-89

US Department of Agriculture, Soil Conservation Service EIS-92

US Department of Housing and Urban Development EIS-93

US Department of Transportation EIS-94

STATE

Louisiana Department of Natural Resources, Coastal Management Section EIS-95

Louisiana Department of Transportation and Development EIS-96

Louisiana Department of Culture, Recreation, and Tourism Office of Cultural Development EIS-97

OTHERS

Lafourche-Terrebonne Soil and Water Conservation District EIS-98

U.S. FISH AND WILDLIFE SERVICE COORDINATION ACT RECOMMENDATIONS

204. A Draft Fish and Wildlife Coordination Act Report (CAR) was prepared by the U.S. Fish and Wildlife Service (FWS) in March of 1983. The CAR, Public Law 85-624 of 12 August 1958, provides that fish and wildlife conservation receive equal consideration and coordination with other project purposes. The act also indicates the Department of the Interior will provide recommendations for wildlife conservation and development, and the reporting agency will give consideration to those recommendations. The FWS provided six recommendations which are listed and responded to in Table 9 on page EIS 98-A. Their Final CAR for both the project and the Mitigation Report/FEIS will be attached to the latter document which is soon to be released. The recommendations in their Final CAR is not expected to differ from those in their Draft CAR.



REGION VI
INTERFIRST TWO BUILDING 1201 ELM STREET
DALLAS TEXAS 75220

AUG 23 1984

1

Colonel Robert C. Lee
District Engineer
New Orleans District
U.S. Army Corps of Engineers
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel Lee:

We have completed our review of your agency's Draft Supplemental Environmental Impact Statement (EIS) for the proposed barose to Golden Meadow Hurricane Protection Project and Mitigation Report, Terrebonne and Lafourche Parishes, Louisiana.

We classify your Draft Supplemental Environmental Impact Statement as LO-1. Specifically, we have no objections to the proposed project action. The statement contained sufficient information to evaluate the associated environmental impacts. Our classification will be published in the Federal Register in accordance with our responsibility to inform the public of our views on the proposed Federal action under Section 309 of the Clean Air Act.

Definitions of the categories are provided on the enclosure. Our procedure is to categorize the EIS on both the environmental consequences of the proposed action and to the adequacy of the EIS at the draft stage, whenever possible.

We appreciate the opportunity to review the Draft EIS. Please send our office two (2) copies of the Final EIS at the same time it is sent to our Office of Federal Activities, U.S. Environmental Protection Agency, Washington, D.C.

Sincerely yours,

Frank Whittington, P.E.
Regional Administrator

Enclosure

1. i. Acknowledged.

RD-A154 982

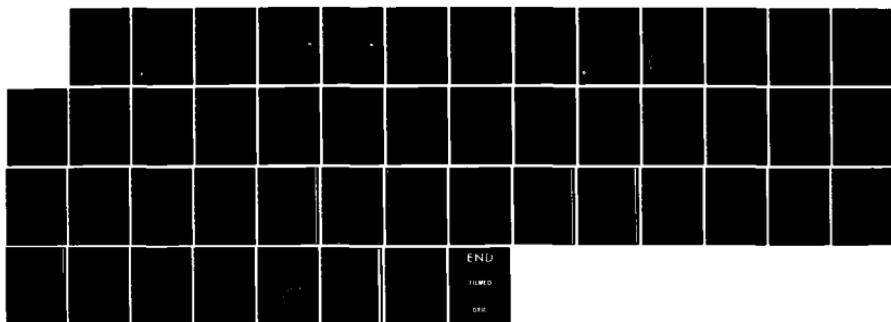
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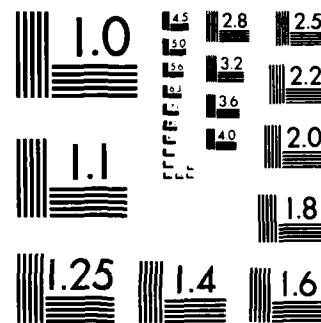
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United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Project Review

Po Box 2888

ALBUQUERQUE, NEW MEXICO 87103

August 29, 1984

ER 84/892

Colonel Eugene Witherspoon
District Engineer
U.S. Army Corps of Engineers
Po: Office Box 60267
New Orleans, Louisiana 70160

Dear Colonel Witherspoon:

We have reviewed the Draft Supplemental Environmental Impact Statement and Draft Mitigation Report, and Appendixes for the Larose to Golden Meadow Hurricane Protection Project, Lafourche Parish, Louisiana and have the following comments.

General Comments

The Fish and Wildlife Service (FWS) has consistently recommended the proposed hurricane protection levees be realigned to the maximum extent possible, to exclude vegetated wetlands from enclosure and subsequent drainage. However, the levee alignment described in the "tentatively selected plan" would still result in the enclosure and eventual drainage of nearly 3,000 acres of valuable coastal wetlands. The FWS is concerned that none of the four alternative plans considered would avoid enclosure of wetlands to the maximum extent possible. In effect then, the subject documents fail to demonstrate compliance with Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands).

The FWS has cooperated in the development of a mitigation plan to offset avoidable impacts. As a result of the failure to implement mitigation plan in a timely manner and the urgent need to reduce habitat deterioration within the proposed mitigation area, many of the structural features of the proposed mitigation plan have already been completed by private interests as mitigation for federally permitted activities in nearby wetlands. The mitigation report does, however, acknowledge that little if any mitigation benefit could now be claimed for the plan as proposed, and future efforts will be required to develop a new mitigation plan.

The subject documents frequently cite the causes of vegetated-wetland loss in the project area as saltwater intrusion brought about by canal excavation for oil, gas, and sulfur extraction, subsidence, and erosion. Those documents fail to acknowledge another major cause of continued wetland loss in the project area, i.e., the elimination of freshwater and sediment inflow due to levee construction along the lower Mississippi River and, in particular, elimination of Bayou Lafourche as a distributary of the Mississippi River. In acknowledgement of that fact, it would seem appropriate to support, via project funding,

(2)

- 2.1. Since publication of the 1974 Final EIS, certain alignments have been modified to reduce marsh loss. The levee alignment in Section A West has been moved nearer the wetland/nonwetland interface. To move the alignment closer to the interface would necessitate numerous pipeline relocations. Instead of 2,700 acres of wetland being impacted as originally designed, now 1,200 acres are affected. In Section E South, the possibility of placing the levee at the marsh interface was investigated; however, the area is already enclosed by a locally constructed levee. Following the local alignment reduces the necessary levee length from 6.5 to 4.0 miles at a saving of a \$4.3 million. In Section C North, the proposed alignment follows the local levee which encloses 650 acres of wetland. To follow the marsh interface would result in 3.8 miles of new levee as opposed to raising 1.11 miles of present levee at a saving of about \$4 million. During early stages of investigating leveeing Clovelly Farms, a levee alignment was proposed which would have crossed the marsh from the southwest corner of the Farms to the ridge. This would have impacted approximately 1,000 acres of marsh/open water, and 1.3 miles shorter than following the existing levees. For both environmental and economic reasons, it was decided to follow existing levees and exclude the 1,000 acres.

Although the wetland impacts are significant initially, most of the areas are already enclosed by locally constructed levees and are being converted to alternative uses. When acres are projected through the life of the project (2096), there will be no marsh in the impact area with the project, but only 374 acres without the project. Where possible, impacts on wetlands and open water have been avoided by moving levees toward the wetland/non-wetland interface (A East and Clovely Farms) and have enclosed marsh only when excluding it would be excessively costly (E South, C North). Thus, as stated in Paragraphs S-8 and S-9, we are in compliance with Executive Orders 11988 and 11990 because we have avoided impacts on wetlands to the maximum extent practicable.

- 2.2. A new mitigation plan is being developed in conjunction with the US Fish and Wildlife Service and Louisiana Department of Wildlife and Fisheries.
- 2.3. The impact of Mississippi River training has been added to this document. The Bayou Lafourche distributary was closed in 1904 by the Corps of Engineers, and, it is acknowledged, this action has reduced freshwater and sediment inflow into the Barataria Bay Basin. It is not appropriate to use flood control funding to mitigate for a non-related activity occurring in 1904. Implementation of the Proposed Louisiana Coastal Area, Louisiana, project will help alleviate some of the saltwater infusion into the basin.

enhancement of that portion of the Pointe-au-Chien Wildlife Management area not proposed for inclusion under the mitigation proposal. Such enhancement is provided for via the Federal Water Project Recreation Act, Public Law 89-72, as amended (16 U.S.C. 460-1 (12), et seq.).

We appreciate the close cooperation exhibited by the Corps of Engineers in the development of the existing mitigation plan. Because that plan will no longer suffice to mitigate project-induced damages to fish and wildlife resources, the FWS stands ready to assist in the formulation of a revised mitigation plan. They are also prepared to work cooperatively with the Corps of Engineers and the Louisiana Department of Wildlife and Fisheries toward the development of an enhancement program that will benefit the entire Pointe-au-Chien Wildlife Management Area. Further coordination in this regard can be initiated by contacting the Field Supervisor, Division of Ecological Services, U.S. Fish and Wildlife Service, P.O. Box 4305, Lafayette, Louisiana 70502 (318-264-6630).

Specific Comments

2.4

2.4. Reference item 2 above.

Draft Mitigation Report, Page 17, paragraph 21 - The one-time replacement of weirs, as provided for in the mitigation cost estimate, would be inadequate to maintain a viable 10-year mitigation program. It is common knowledge among State and private land managers in coastal Louisiana that weirs of the type being proposed in the mitigation plan have a maximum life expectancy of approximately 25 years. Accordingly, mitigation cost estimates should include a provision for the three-time replacement of weirs.

Summary, Page 5-7, Table 1 - Indicates "partial compliance" with the Land and Water Conservation Fund Act. The notation should be "not applicable" since there are no Land and Water Conservation Fund sponsored sites in the project area.

Thank you for the opportunity to comment on these documents.

2.5

2.5. The need for additional weir replacements will be evaluated in a new mitigation report.

2.6

2.6. Acknowledged.

Sincerely,

Raymond P. Churan
Regional Environmental Officer



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration

(3)

August 31, 1984

Colonel Robert C. Lee
District Engineer, New Orleans District
Department of the Army, Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Colonel Lee:

This is in reference to your draft environmental impact statement for Larose to Golden Meadow, Louisiana, hurricane protection project. Enclosed are comments from the National Oceanic and Atmospheric Administration.

We hope our comments will assist you. Thank you for giving us an opportunity to review the document. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

[Signature]
Joyce M. Wood
Chief, Ecology and
Conservation Division

Enclosure

DC:das



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Region

950 Kuerner Boulevard
St. Petersburg, FL 33702

August 21, 1984 F/SERL/PK
813-893-3503

Colonel Robert C. Lee
District Engineer, New Orleans District
Department of the Army, Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Colonel Lee:

The National Marine Fisheries Service (NMFS) has received the Draft Supplemental Environmental Impact Statement (DSEIS) Larose to Golden Meadow, Louisiana, Hurricane Protection Project dated June 1984. We have reviewed the DSEIS and the accompanying Draft Mitigation Report and offer the following general comments for your consideration. Our review concentrated on those parts of the project likely to have the greatest impacts on marine fishery resources and their habitats.

This DSEIS adequately discusses the environment, including fishery resources, and the environmental effects of each of the proposed alternatives. The mitigation plan to offset wetland losses also is adequately described. In this regard, the document correctly states that the NMFS does not consider the mitigation plan to be adequate to completely offset the productivity of fish and shellfish that would be lost to project implementation.

The NMFS has objected to the amount of wetlands degraded and destroyed by this project and consistently has recommended alignments that would reduce the impacts (see our letters to the New Orleans District Corps of Engineers dated December 13, 1974; November 19, 1975; January 13 and July 6, 1977; and May 25, 1980). Of the plans presented in the DSEIS, construction of the Least Environmentally Damaging (LED) plan would directly impact 1,220 acres of habitat (466 acres of marsh and 954 acres of open water). This is far greater than the amount of habitat that would be impacted if the levee were placed along the wetland/non-wetland interface—an alternative that should be discussed in the PSEIS. Implementation of the Tentatively Selected Plan (TSP) would result in the alteration of 1,454 acres of wetlands and shallow water by construction activities, in addition to 3,144 acres of wetlands that would be enclosed by levees and subjected to drainage and clearing.

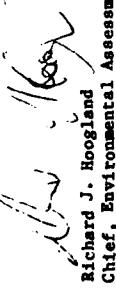
To compensate for wetland losses, a mitigation plan, part of which already has been constructed by other entities, is presented both in the DSEIS and the Mitigation Report. The mitigation would enhance 4,598 acres of the Point au Chien Wildlife Management Area (WMA) by reducing saltwater intrusion. The



mitigation plan, coordinated with the Louisiana Department of Wildlife and Fisheries (LDWF) and the U.S. Fish and Wildlife Service, was presented to the South Lafourche Levee District in September 1982 and adopted in July 1983. Implementation is tentatively scheduled for 1985. This delay in implementation while levee construction continued, resulted in the LDWF manager of Point au Chien WMA constructing two of the proposed weirs as mitigation for some impacts of another project. Thus, we believe that the mitigation plan, which we had already considered inadequate, is now much more severely deficient in offsetting the loss of fishery production. We therefore urge that additional mitigation be developed for incorporation in the FSEIS and Supplemental Information Report and that the remainder of the existing mitigation plan be implemented as soon as possible. It is imperative that enhancement of existing marsh vegetation and reduction of saltwater intrusion, while maintaining adequate ingress and egress of marine organisms, be undertaken to offset current losses (from completed and on ongoing levee construction) of habitat supportive of marine fishery resources.

We would appreciate the opportunity to participate in discussions for additional mitigation and to review the Supplemental Information Reports for such mitigation.

Sincerely yours,


Richard J. Hoogland
Chief, Environmental Assessment Branch

3.3
3.3. A new mitigation report and an associated EIS will be prepared. This document is scheduled to be available by mid-1985.



United States Soil Conservation Service
Department of Agriculture
Chief, Planning Division
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Mr. Cletis R. Wagahoff
Chief, Planning Division
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

Dear Mr. Wagahoff:

RE: Planning Division, Environmental Analysis Branch

We have reviewed the Draft EIS and appendices for the Larose to Golden Meadow, Louisiana, Hurricane Protection Project. The tentatively selected plan would eliminate 217 acres of agricultural land due to levee right-of-way. These 217 acres found within the Clovelly and LL&E farm properties are not considered prime farmland. These soils may be classified as unique farmland if devoted to one of the following uses: sugarcane, citrus, catfish ponds or crayfish ponds. Your EIS should address the impacts on unique farmland.

The U. S. Department of Agriculture has published final rules for implementation of the Farmland Protection Policy Act (FPPA). Enclosed is a copy of the Act and these rules which became effective August 6, 1984. The purpose of the Act and rules is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. Section 658-4 describes the actions federal agencies are to take to comply with the rules. Enclosed is copy of Form AD1006. Please call on us for additional information concerning the FPPA.

The EIS does not clearly present the effects of a drainage structure and levee blocking small boat movement through Yankee Canal. What plans are made for travel from Bayou Lafourche through Yankee Canal into areas east of the protection levee?

We appreciate the opportunity to provide these comments.

Sincerely,
Mark Rockwell
Mark Rockwell

Harry S. Rucker
State Conservationist

Enclosures

The Soil Conservation Service
An Agency of the
Department of Agriculture

cc: Thomas N. Shiflet, Director, Ecological Sciences, SCS, Washington, D.C.

4

- 4.1. The LL&E Farm has about 500 acres of land managed as crayfish pond, and Clovelly Farm has about 1,650 acres in sugarcane/soybeans. Levee construction would impact about 70 and 60 acres of the above acreages, respectively. The levee would protect the remaining lands. Reference paragraph 169.
- 4.2. This act is not applicable to this project because construction was ongoing by June 1983.
- 4.3. Boat movement through the Yankee Canal would be restricted. A boat launch facility would be provided to allow access to the canal. Reference paragraph 154.



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FORT WORTH REGIONAL OFFICE
221 WEST LANCASTER AVENUE
P.O. BOX 28065
FORT WORTH, TEXAS 76113

REGION VI

(5)

IN REPLY REFER TO

August 20, 1984

Mr. Cletis R. Wagahoff
Chief, Planning Division
Department of the Army
New Orleans District, Corps of Engineers
P.O. Box 60267
New Orleans, LA 70160

Dear Mr. Wagahoff:

The Supplemental Draft Environmental Impact Statement and appendices for the Hurricane Protection Project from Larose to Golden Meadow, Louisiana, has been reviewed by our New Orleans Office.

It has been determined that the Department has no direct program involvement in the proposed action. We defer to other agencies in respect to flooding, agricultural, and wetlands displacement, fish and wildlife impacts and to the proposed mitigative measures.

In compliance with Section 1503.2, Council on Environmental Quality Regulations, we submit a no comment response.

Sincerely,

I.J. Ramsbottom
Regional Environmental Officer

5.1

EIS-93

AREA OFFICES
DALLAS, TEXAS - LITTLE ROCK, ARKANSAS - NEW ORLEANS, LOUISIANA - OKLAHOMA CITY, OKLAHOMA - SAN ANTONIO, TEXAS



P. O. BOX 380
BATON ROUGE, LOUISIANA 70805

July 19, 1984

REASON 6

REPLY REFER TO

Draft Supplemental EIS and
Draft Mitigation Report
Larose to Golden Meadow
Hurricane Protection Project

Mr. Cletis R. Wagahoff, Chief
Planning Division
Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

Dear Mr. Wagahoff:

We have no comments to offer on the subject document dated June 1984.

Thank you for providing an opportunity to comment.

Sincerely yours,

J. N. McDonald
J. N. McDonald
Division Administrator

6.1

EIS-94

6.1. Acknowledged

(7)

EDWIN W. EDWARDS
GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

WILLIAM C. HULS
SECRETARY

August 16, 1984

Mr. Cletis R. Wagahoff, Chief
Planning Division
Environmental Analysis Branch
Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160

RE: C840312
Larose to Golden Meadow, Louisiana
Hurricane Protection Project
Draft Supplemental EIS and
Draft Mitigation Report

Dear Mr. Wagahoff:

In accordance with the NOAA regulations on federal consistency 15 CFR 930.41 (b) we request an extension of the 45 day period to review the above referenced project. Because this project was never reviewed by this office due to its implementation prior to the inception of the Louisiana Coastal Resources Program (LCRP), and because the proposed mitigation plan will require further modifications, a proper evaluation of the consistency of this project with the LCRP within the initial 45 day review period is not possible.

If you have any questions concerning this matter, please contact Mr. Frank Monteferrante of my staff.

7.1. The Larose to Golden Meadow, Louisiana project was authorized in 1965, a General Design Memorandum (GDM) prepared in 1972, and work begun in October of 1975. Because the Louisiana Coastal Resources Program was implemented in October of 1980, these project features described in the GDM do not require a consistency determination. Although exempt, project features not yet completed are consistent, to the maximum extent practicable, and were evaluated in the Consistency Determination found in Appendix B. The Clovelly Farms and LLE tracts are also evaluated in the same document and found to be consistent to the maximum extent practicable. Full compliance is expected once the revised mitigation plan is completed and approved.

Sincerely,

William C. Huls


By: Charles G. Groat
Dr. Charles G. Groat

WCH/ct

cc: Ann Berger-Blunden
Peter Tweedt
Debra Walker

NATURAL RESOURCES BUILDING P.O. BOX 44396 BATON ROUGE, LOUISIANA 70804 PHONE 342-4300



Louisiana Department of Transportation and Development

P. O. BOX 44245 CAPITOL STATION
BATON ROUGE, LA. 70804
July 30, 1984

Robert G. Graves
Secretary



Edwin W. Edwards
Governor

(8)

Colonel Robert C. Lee
District Engineer
U.S. Army, Corps of Engineers
P. O. Box 60267
New Orleans, Louisiana 70160

RE: Draft Mitigation Report for the
Larose to Golden Meadow, Louisiana,
Hurricane Protection Project

Dear Colonel Lee:

This office is in receipt of a copy of the draft supplemental E.I.S. and draft mitigation report for the Larose to Golden Meadow, Louisiana, Hurricane Protection Project.

This is to advise that a review has been made of the draft documents and we have no objections to offer to the mitigation plan and no other comments or recommendations to offer at this time.

Thank you very much for giving us the opportunity to review the plan.

Yours truly,

Arthur R. Theis

ARTHUR R. THEIS
Deputy Chief Engineer

ART:drn--cb

cc: South Lafourche Levee District
Mr. Warren Beedle



State of Louisiana
DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF CULTURAL DEVELOPMENT
ROBERT B. DEBLIEUX
ASSISTANT SECRETARY
Edwin W. Edwards
Noelle LeBlanc

August 8, 1984

(9)

Mr. Cletis R. Wagahoff
Chief, Planning Division
Department of the Army
New Orleans District, Corps
of Engineers
P. O. Box 60267
New Orleans, LA 70160

Re: Draft Supplemental Environmental
Impact Statement (DSEIS) and
Appendices
Golden Meadow, Louisiana, Hurricane
Protection project
Lafourche Parish, Louisiana

Dear Mr. Wagahoff:

Reference is made to your letter of June 29, 1984, requesting our review of the above document.

Appendix A, Section A.6, Archaeology Resources, presents a concise summary of the cultural resources investigations which have been conducted to date. The data contained in the summary is an accurate assessment of project impact on cultural resources and we have no further comments to add.

If we may be of further assistance, do not hesitate to contact my staff in the Division of Archaeology.

Sincerely,

Robert B. DeBlieux
State Historic Preservation Officer

RBD:PGR:tb

DIS-97

9.1

9.1. Acknowledged.

BOARD OF SUPERVISORS

August 22, 1984

WARREN J. MARANG, Jr.
Chairman
P.O. Box 60267
New Orleans, Louisiana 70160

ANDRE BOUROUDIS
Secretary/Treasurer
P.O. Box 60267
New Orleans, Louisiana 70160

FRANCIS J. BLAIS
H. LAMBERT LAUDOT
R. THIBODEAUX

Department of the Army
U. S. Corps of Engineers
New Orleans District
P.O. Box 60267
New Orleans, Louisiana 70160

Dear Colonel:

I have reviewed the Draft Supplemental Environmental Impact Statement and Draft Mitigation Reports of June 1984. These reports concern the Hurricane Protection Project from Larose to Golden Meadow.

The Board of Supervisors of the Lafourche-Terrebonne Soil and Water Conservation District is in agreement with your mitigation plan to build a 7 mile levee to protect the Pointe au Chien Reserve with the following provision:

Adequate Weir structures and drainage outlets are provided so that the levee does not cause more flooding than is now experienced on agricultural lands.

Thanking you very much, I remain

Yours truly,

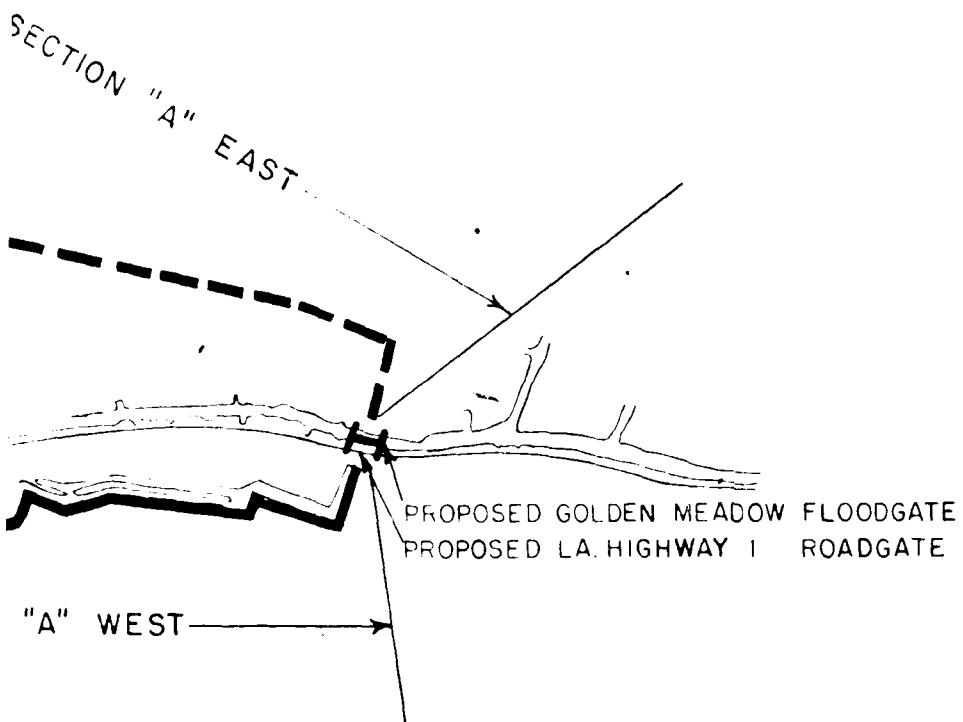
Warren J. Marang, Jr.
Chairman

cc: Windell A. Gurole
James Winston, Crowley
Wayne Bordeion, SCS, Thibodaux

CONSERVATION DEVELOPMENT SELF GOVERNMENT

LEGEND

- Existing Levee
- Proposed Levee
- Proposed Floodwall
- H Proposed Floodgate



LAKING TO GOLDEN MEADOW, LA., U.S.A.
HURRICANE PROTECTION PROJECT

PLAN I

TENTATIVELY SELECTED PLAN

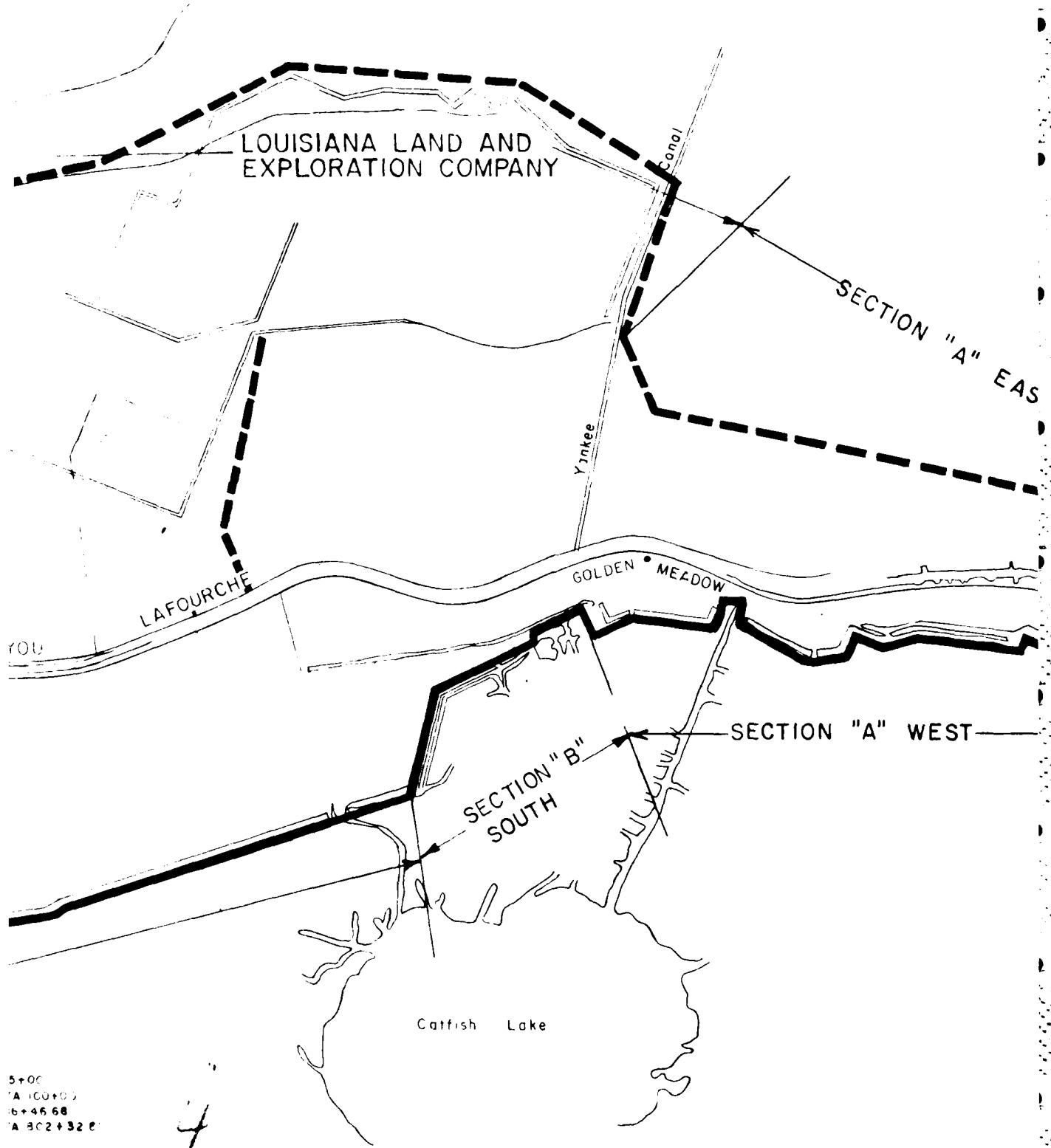
U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

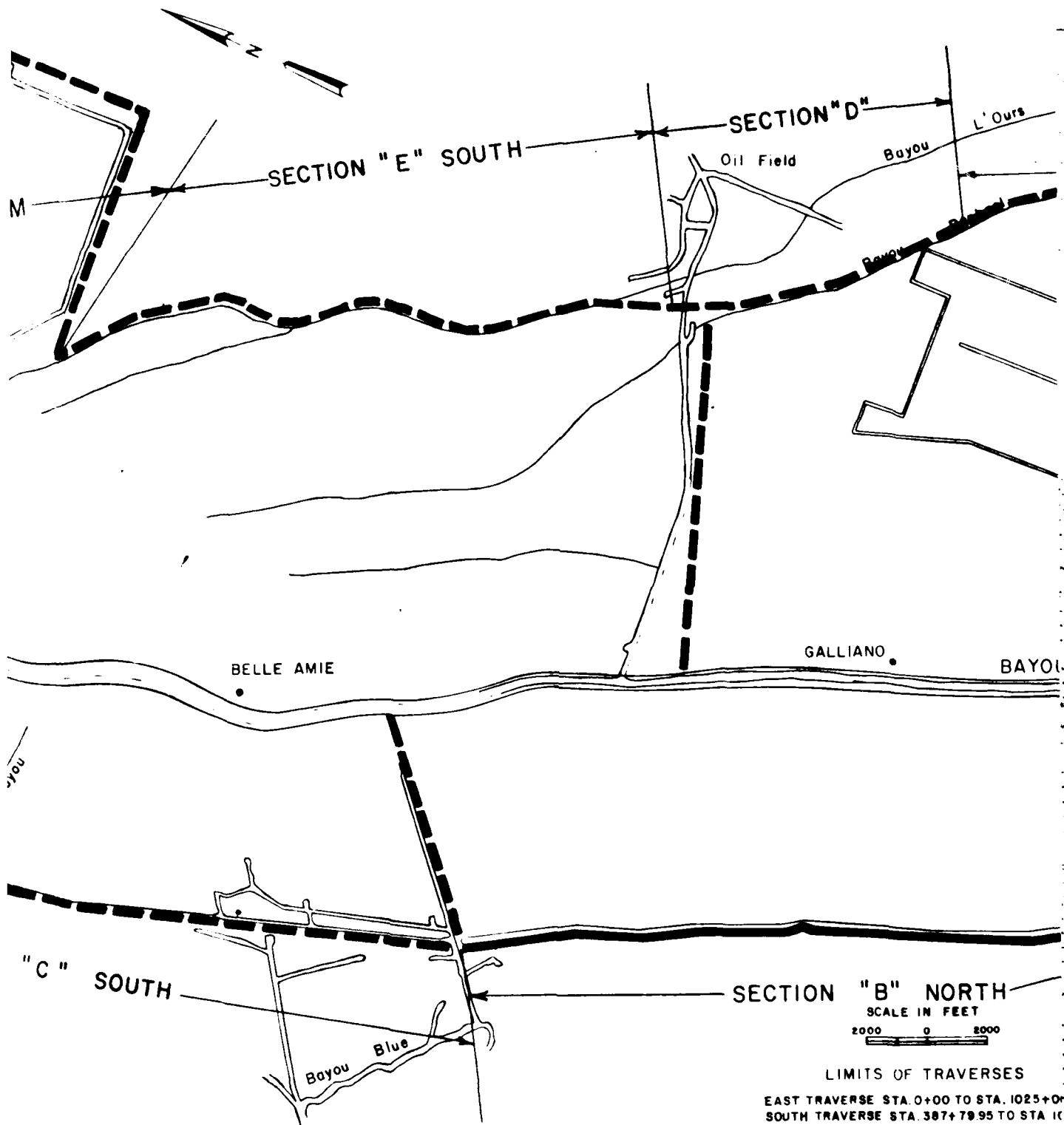
AUGUST 1982

FILE NO. H-2-29491

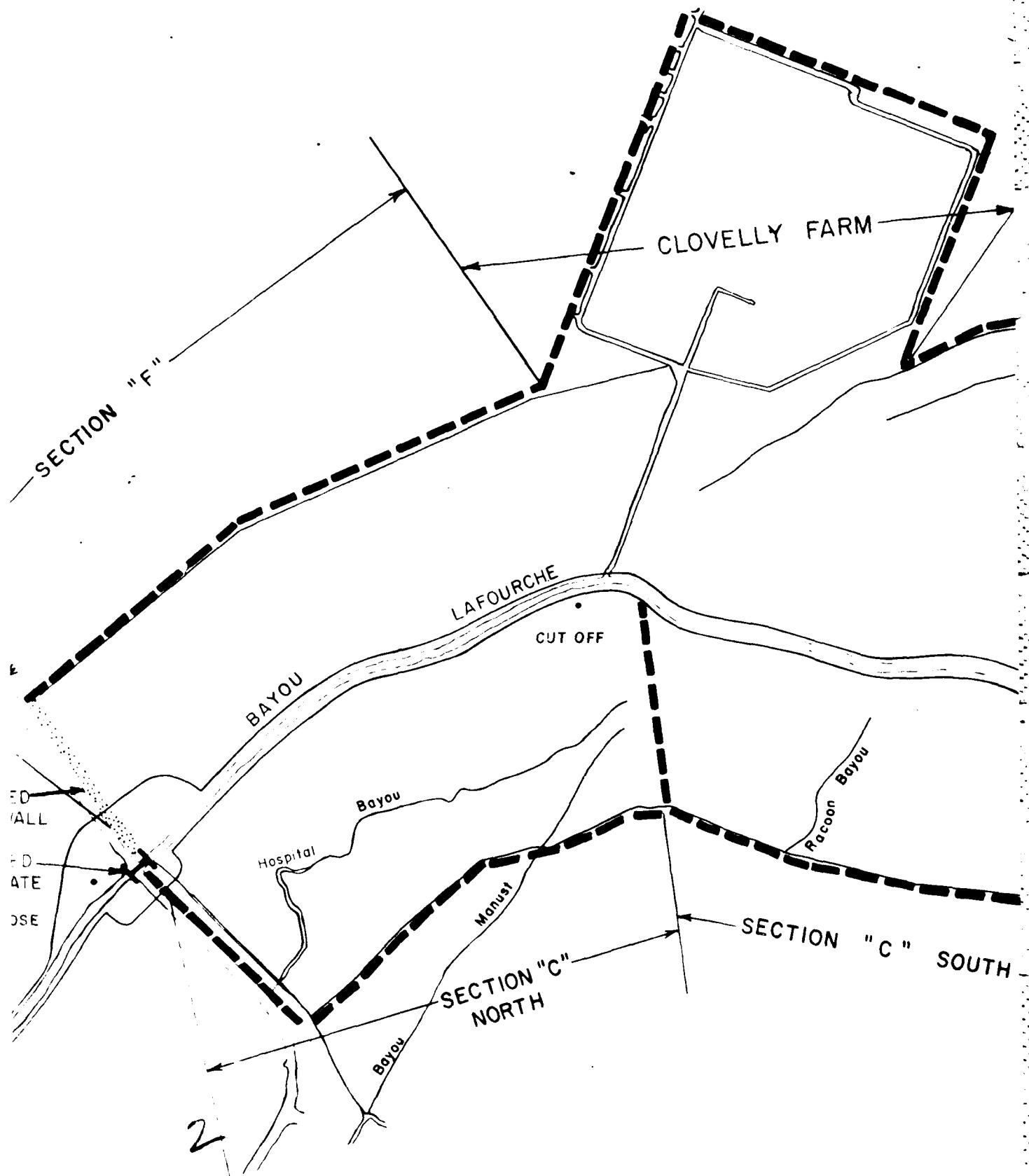
PLATE 3

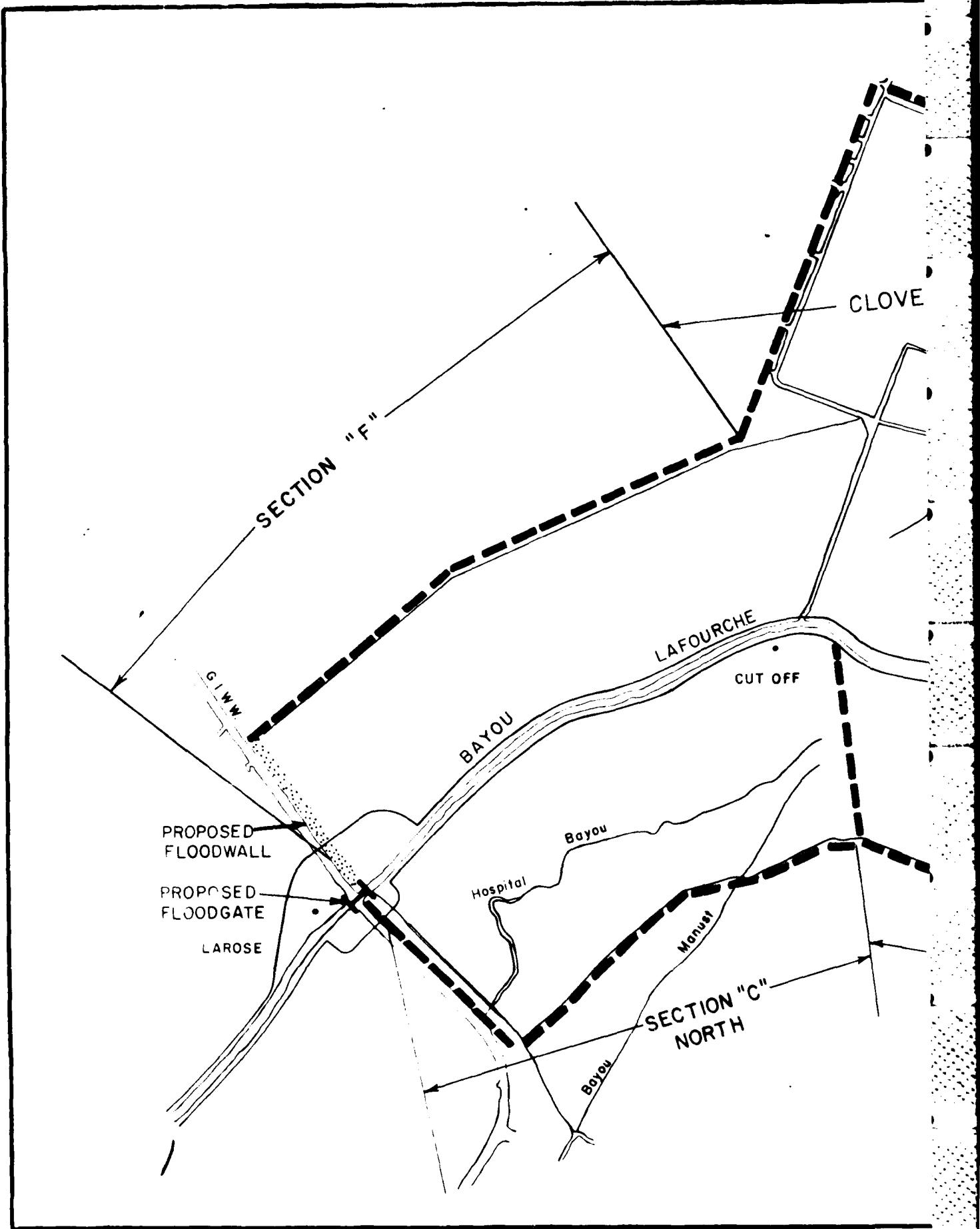
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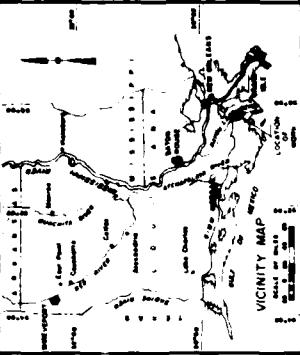




LIMITS OF TRAVERSSES
EAST TRAVERSE STA. 0+00 TO STA. 1025+00
SOUTH TRAVERSE STA. 387+79.95 TO STA 1025+00
RING TRAVERSE STA. 246+32 TO STA. 86+44
WEST TRAVERSE STA. -0+40.73 TO STA. 86+44







VICINITY MAP

The site plan illustrates the following components:

- Proposed Drainage Structure:** A vertical line labeled "Proposed Line" with arrows pointing down.
- Proposed Gully:** A vertical line labeled "Proposed Gully" with arrows pointing down.
- Proposed Footwall:** A horizontal line labeled "Proposed Footwall".
- Existing Features:**
 - A vertical line labeled "Existing Channel" with arrows pointing down.
 - A horizontal line labeled "Existing Irrigation Line" with arrows pointing right.
 - A vertical line labeled "Existing Pumping Station" with arrows pointing down.

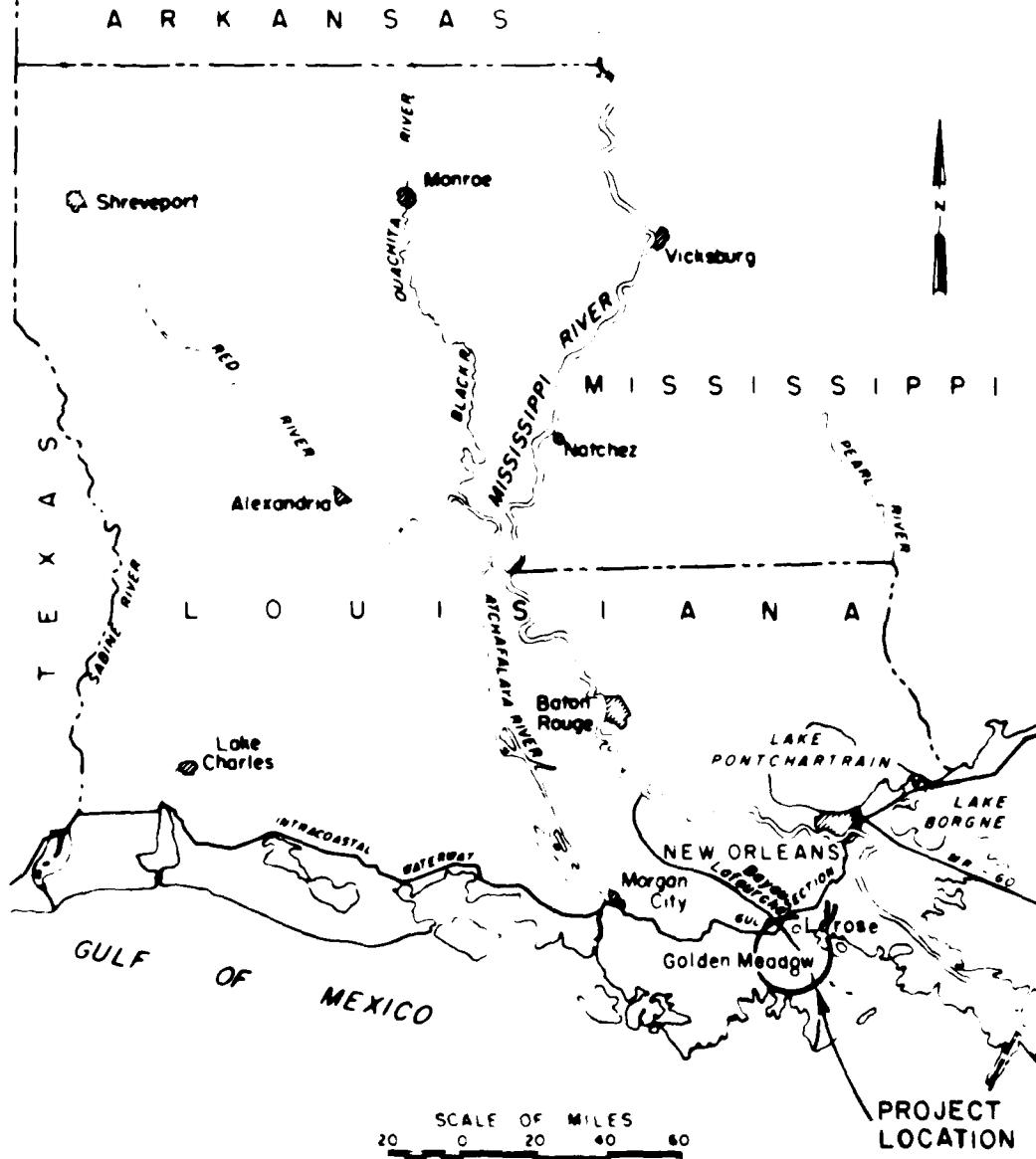
ORIGINAL GDM ALIGNMENT

U. S. ARMY ENGINEERS DISTRICT, NEW ORLEANS
CHIEF OF ENGINEERS

LAND TO GOLDEN BEACH, LOUISIANA
HABITAT PROTECTION PROJECT

PLATE 2

LAW TRAVELERS STA. OHIO TO STA. 027-000
SOUTH TRAVEL ONE STA. 007-000 TO STA. 000-000
ONE TRAVEL ONE STA. 244-32 TO STA. 000-000
ONE ST. TRAVELERS STA. 0-00-73 TO STA. 000-000



LAROSE TO GOLDEN MEADOW, LOUISIANA
HURRICANE PROTECTION PROJECT

PROJECT LOCATION

U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

4 AUGUST 1982

FILE NO H-2 29431

PLATE 1

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Act Report	pp. EIS-29	
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Environmental Effects		App. A, pp. A-21
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Fur Catch and Value	pp. EIS-10	
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List of Preparers	pp. EIS-99	
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Study	pp. EIS-5	
Plans Requested For Consideration After		pp. EIS-6
1974 Final EIS and Subsequently		
Eliminated From Further Study		

LITERATURE CITED

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- Lackey, J. B., G. B. Morgan, and O. H. Hart. 1959. Turbidity effects in natural waters in relation to organisms and the uptake of radiostopes. Univ. Fla. Eng. Indust. Exper. Sta. Tech. Rep. 167, 13 (8) 9pp.
- Tate, J. Jr., and D. J. Tate. 1982. The Blue List for 1982. American Birds, 36(2): p. 126-135.
- Wharton, C. H., W. M. Kitchens, E. C. Pendleton, and T. W. Sipe. 1982. The ecology of bottomland hardwood swamps of the southeast: a community profile. U.S. Fish and Wildlife Service, Biological Services Programs, Washington, D. C. FWS/OBS - 81/37. 133pp.

TABLE 9 (Continued)

USFWS RECOMMENDATIONS & RESPONSES

RECOMMENDATION	RESPONSE
5. If the above recommendations cannot be implemented as an integral part of this hurricane protection project, the full extent of unavoidable adverse impacts to fish and wildlife resources shall be mitigated via implementation of the water management plan for the Pointe au Chien Wildlife Management Area, as outlined in the text of this report, concurrently with construction of the hurricane protection project.	5. As discussed in Paragraphs 24-26, we are developing a plan to fully mitigate wildlife impacts by implementation of a water management plan on the Pointe au Chien WMA. Portions of our previous plan were constructed by others and we are currently finalizing the revised plan with LDWF and USFWS. The Mitigation Report/FEIS will be released in the spring of 1985.
6. In view of the fact that the remainder of the wetlands of the Pointe-au-Chien Wildlife Management Area not proposed for inclusion under the mitigation proposal will continue to deteriorate at an ever increasing rate, a program to enhance the fish and wildlife habitat of that area shall be implemented as provided for in the Federal Water Project Recreation Act, Public Law 89-72, as amended. That enhancement proposal is being developed cooperatively by the FWS and the LDWF, in consultation with the National Marine Fisheries Service.	6. We feel that such enhancement is not a proper concern of the Corps of Engineers at this time. We are examining ways to reduce wetland loss in coastal Louisiana jointly with the USFWS in the Louisiana Coastal Area Study.

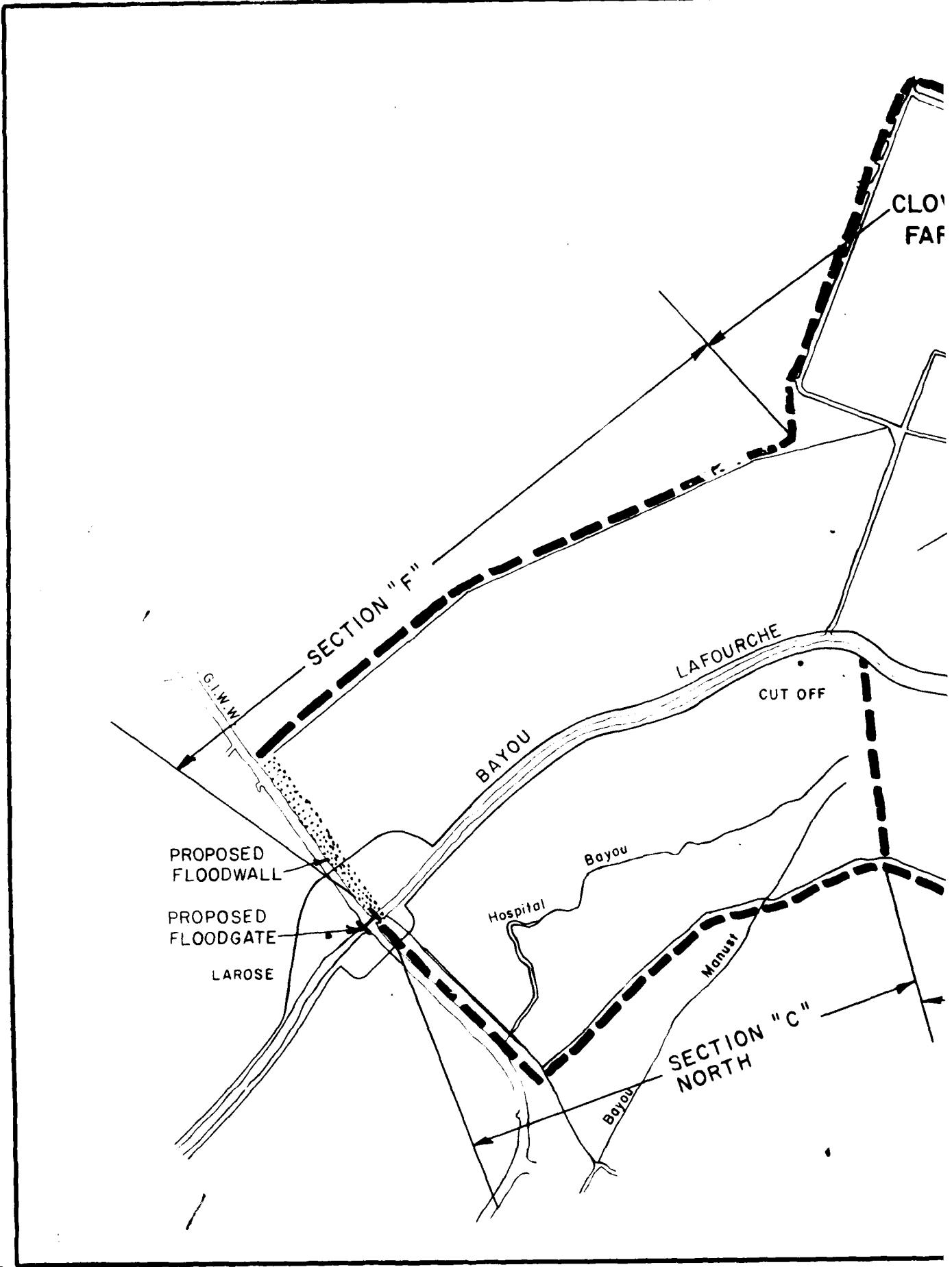
TABLE 9 (Continued)

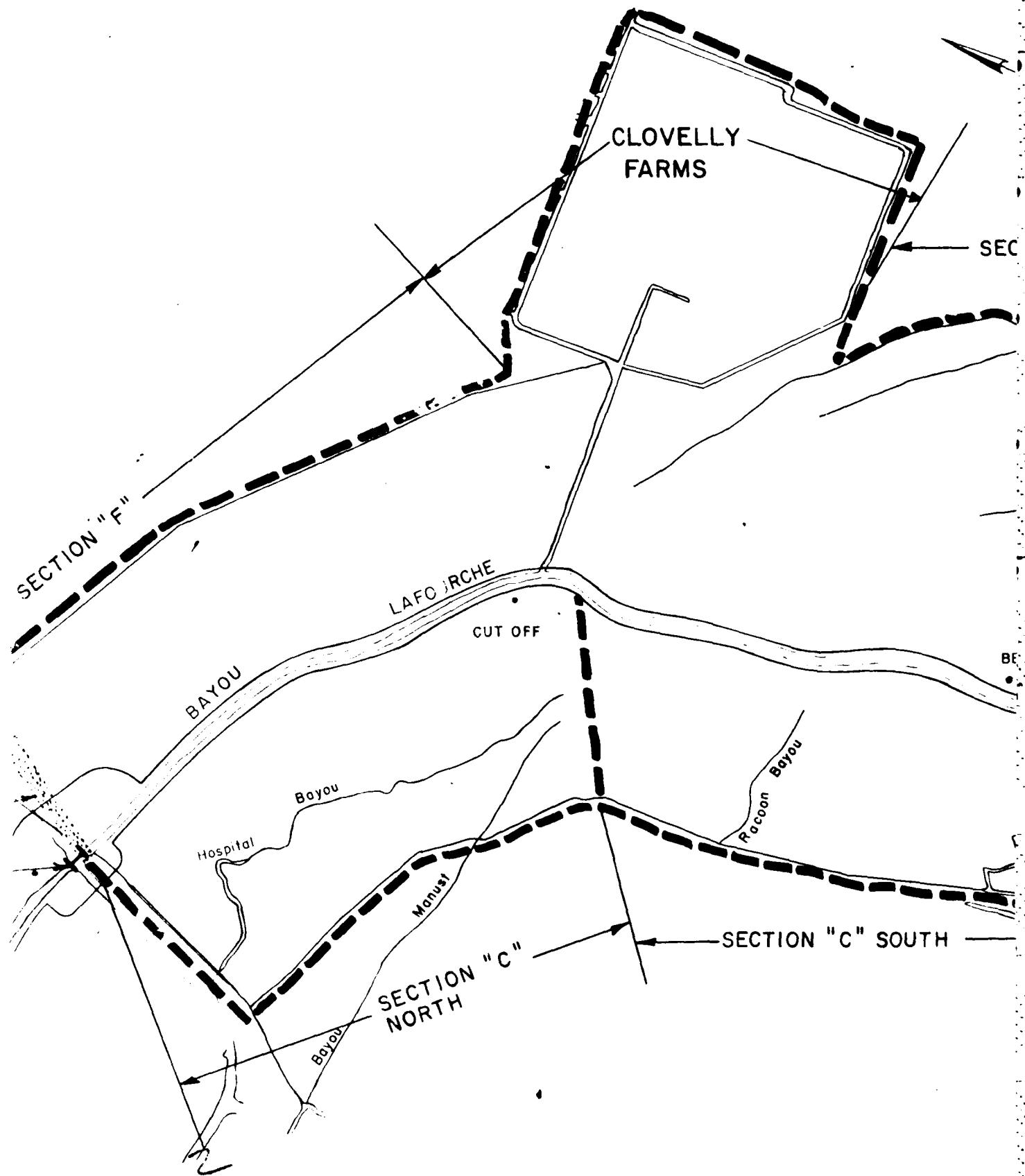
USFWS RECOMMENDATIONS & RESPONSES

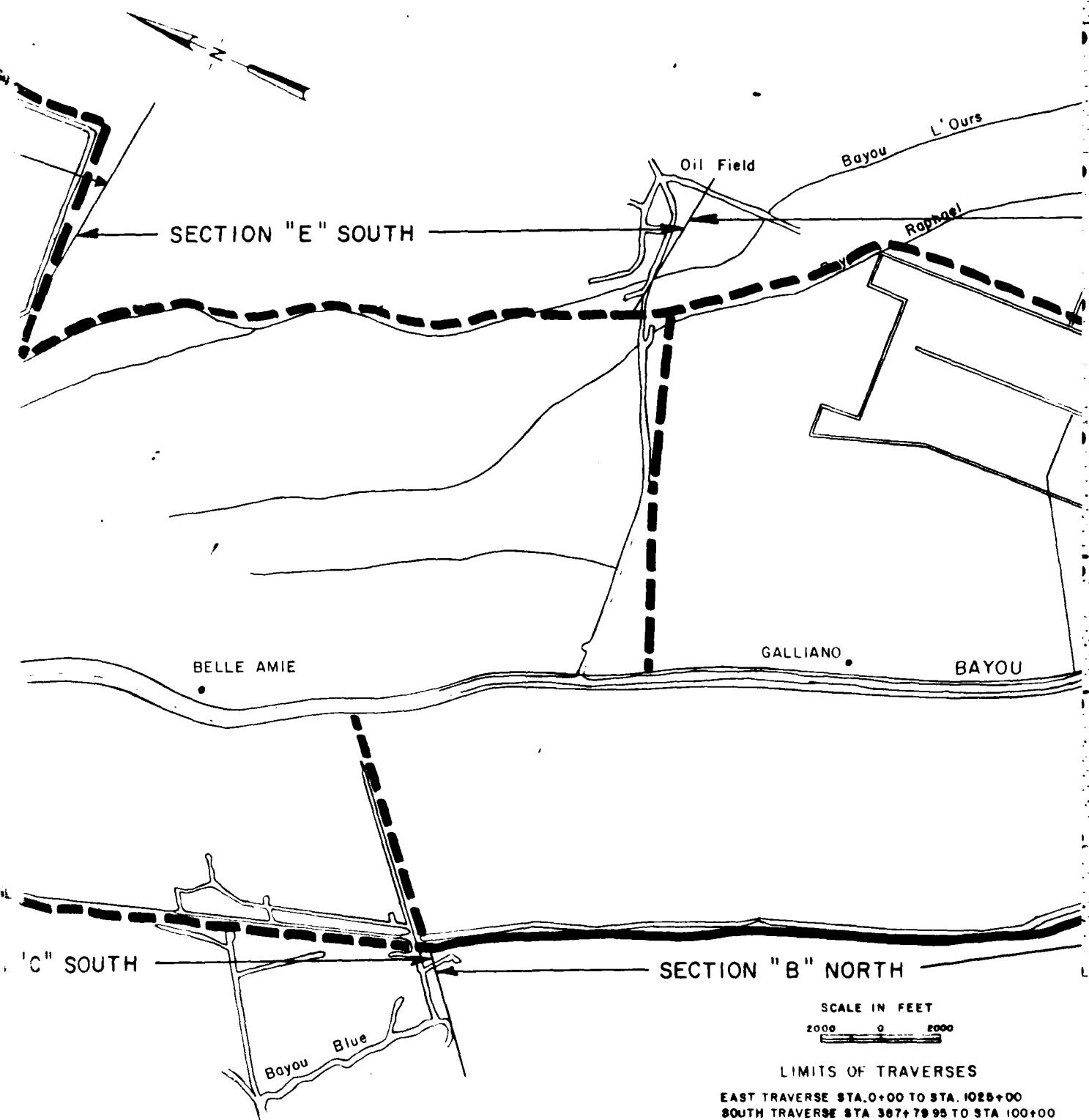
RECOMMENDATION	RESPONSE
b. the proposed levee segment located north of Centerline Station 224+00 shall be moved west of its present alignment to avoid destruction of forested wetlands along the Bayou Raphael ridge,	b. The cost of moving the alignment westward would be approximately \$1.4 million more than the proposed alignment on the Bayou Raphael ridge and only approximately 130 acres of forest would be preserved.
c. the proposed levee segment located between Baseline Stations 66+63 and 77+38 shall be realigned approximately 170 feet to the east to avoid impacts on nesting cover at a wading bird nesting colony located in that segment, and	c. & d. The realignment would be exceedingly expensive, costing \$530,000 more in first costs than the proposed alignment. The colony has been deteriorating and was abandoned sometime prior to 1983. Prior to commencing levee work, a survey would be made and, if the colony is reestablished, construction would be prohibited between Baseline Stations 29+00 and 99+00 from 15 February to 15 August.
d. construction activity shall be prohibited between Baseline Station 29+00 and 99+00 during the period of February 15 to August 15 of each year in order to minimize disturbance of the wading bird rookery.	
4. The levee north of Breton Canal and east of Bayou Lafourche shall be realigned to exclude the nearly 1,700 acres of wetlands in that area from levee protection, or water control structures, that would remain open during normal water periods to allow for tidal exchanges through the levee system, shall be constructed in the proposed levee to preserve the integrity of those wetlands.	4. As discussed in Paragraph S-6, the proposed levee realignment would cost \$4.3 million more than the recommended plan and is not considered a practicable alternative.

TABLE 9
USFWS RECOMMENDATIONS & RESPONSES

RECOMMENDATION	RESPONSE
<p>1. The levee south of Yankee Canal and east of Bayou Lafourche shall be realigned to, as nearly as possible, follow the natural levee along Bayou Lafourche.</p> <p>2. In the Clovelly Farms area:</p> <ul style="list-style-type: none"> a. all borrow material shall be obtained from upland sources or from existing borrow canals, and b. the enclosure of the triangle of marsh near the northwest corner of Cloveilly Farms shall be deleted from project plans. <p>3. In the LL&E area:</p> <ul style="list-style-type: none"> a. no borrow material shall be removed from intermediate marsh, brackish marsh, or forested wetlands, 	<p>1. As discussed in Paragraph S-10, the levee has been moved as near to Bayou Lafourche as engineeringly feasible.</p> <p>2. a. As much borrow material as is practicable will be obtained from existing borrow canals. Obtaining borrow from the nearest upland areas (immediately landward of the levee) would cost over \$300,000 more in first costs than floodside borrow and would reduce the annual benefits by removing agricultural land from production, and would preserve only 45 acres of marsh.</p> <p>b. Deleting the triangle of marsh would increase the first costs by approximately \$800,000 since the length of levee would be more than doubled. Since less than 75 acres of marsh and open water would be protected, the costs of such a realignment were deemed excessive.</p> <p>3. a. Existing borrow areas will be utilized to the maximum extent practicable. The first cost of acquiring borrow from the nearest non-wetland areas has been estimated at nearly \$250,000. Since only 34 acres of marsh and 55 acres of bottomland hardwoods would be saved by borrow realinement, such costs were deemed excessive.</p>



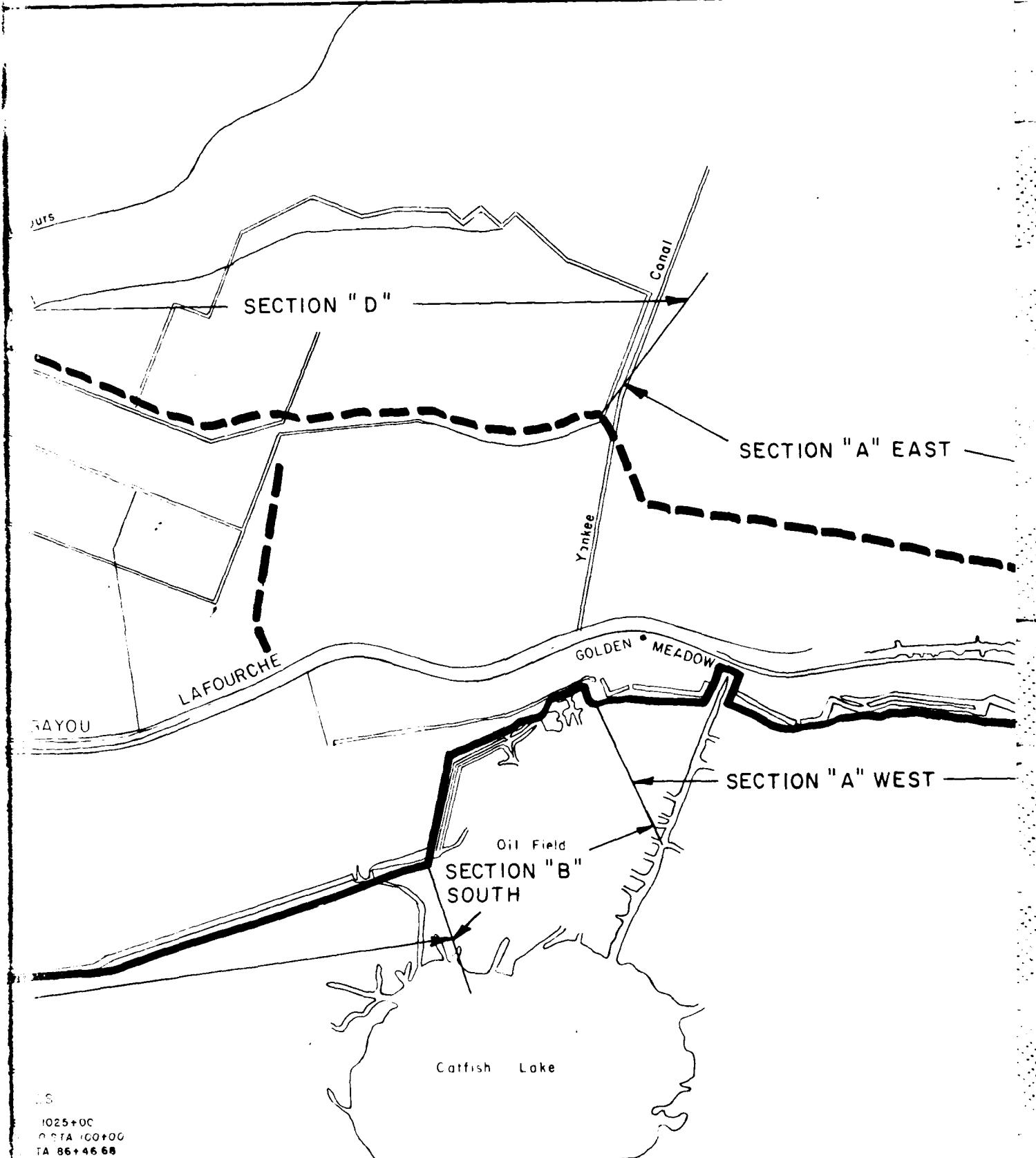




SCALE IN FEET
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LIMITS OF TRAVERSES

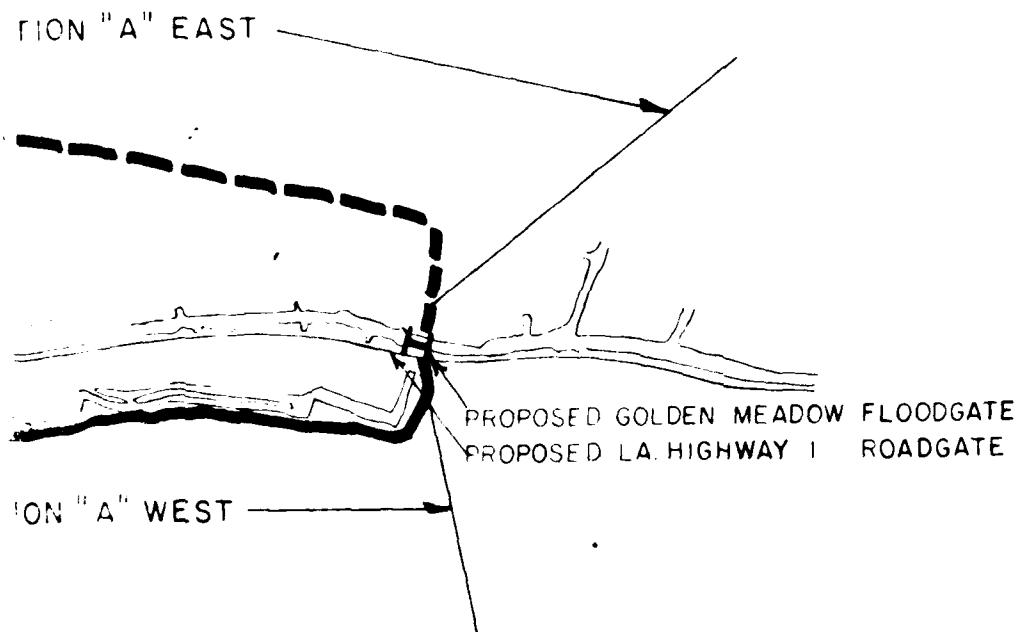
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SOUTH TRAVERSE STA. 387+79.95 TO STA. 100+00
RING TRAVERSE STA. 246+32 TO STA. 06+46.68
WEST TRAVERSE STA. -0+40.73 TO STA. 802+32.81



LS
1025+00
0 STA 400+00
TA 86+46 68
0 STA 802+32 E'

LEGEND

- Existing Levee
- - - Proposed Levee
- Proposed Floodwall
- H Proposed Floodgate



LAH 5 GOLDEN MEADOW, LA, USA
HURRICANE PROTECTION PROJECT

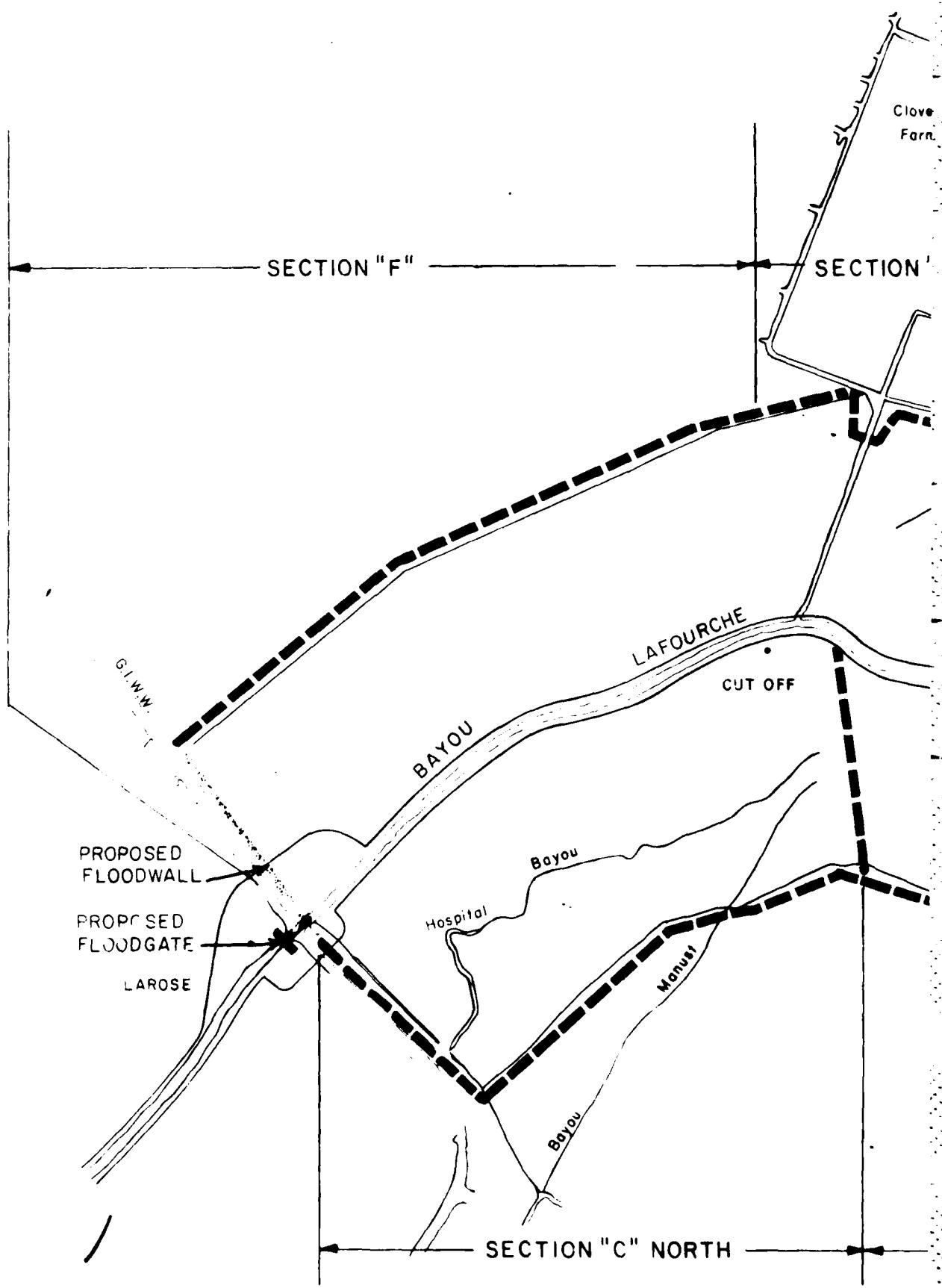
PLAN 2

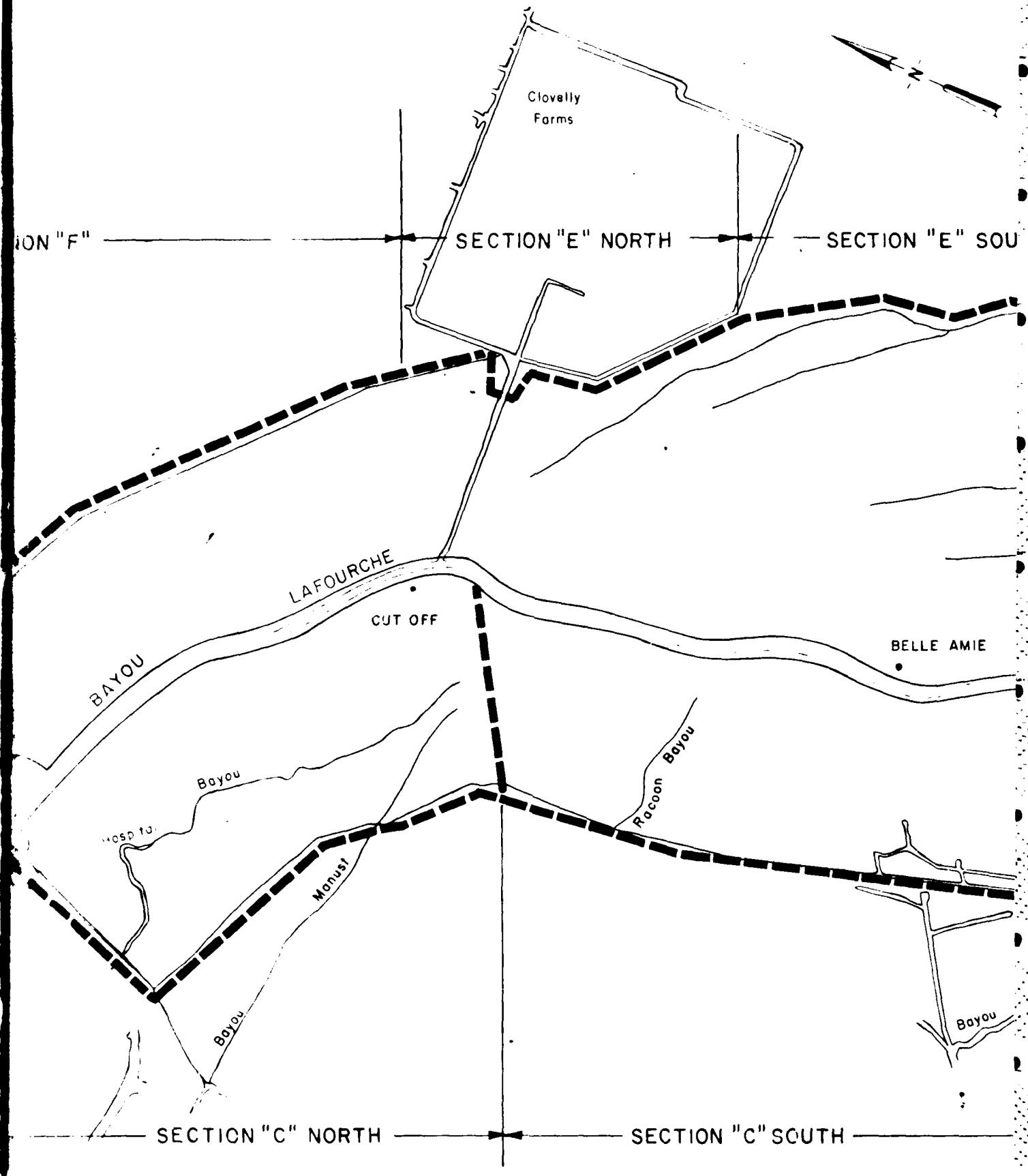
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

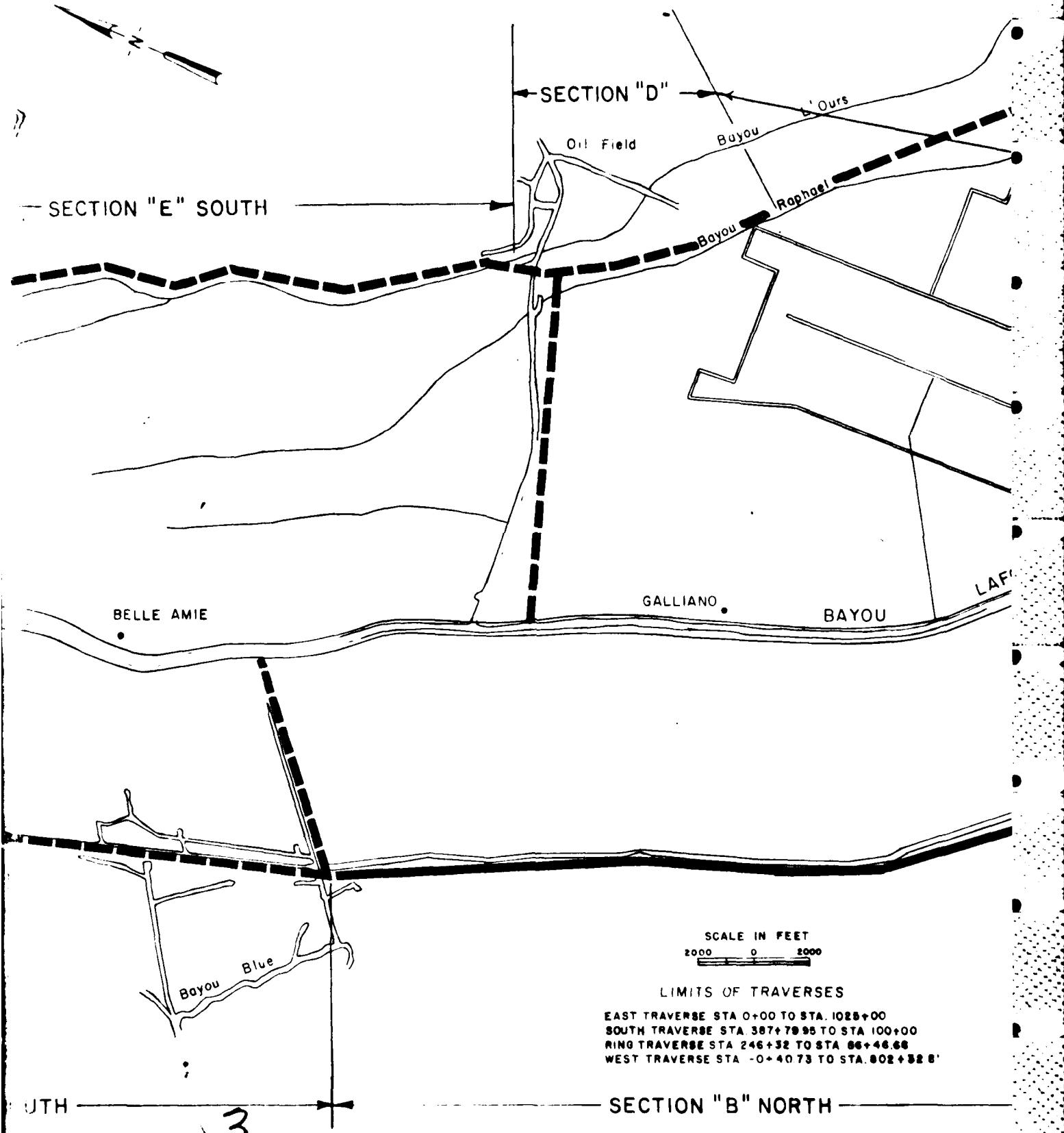
AUGUST 1982

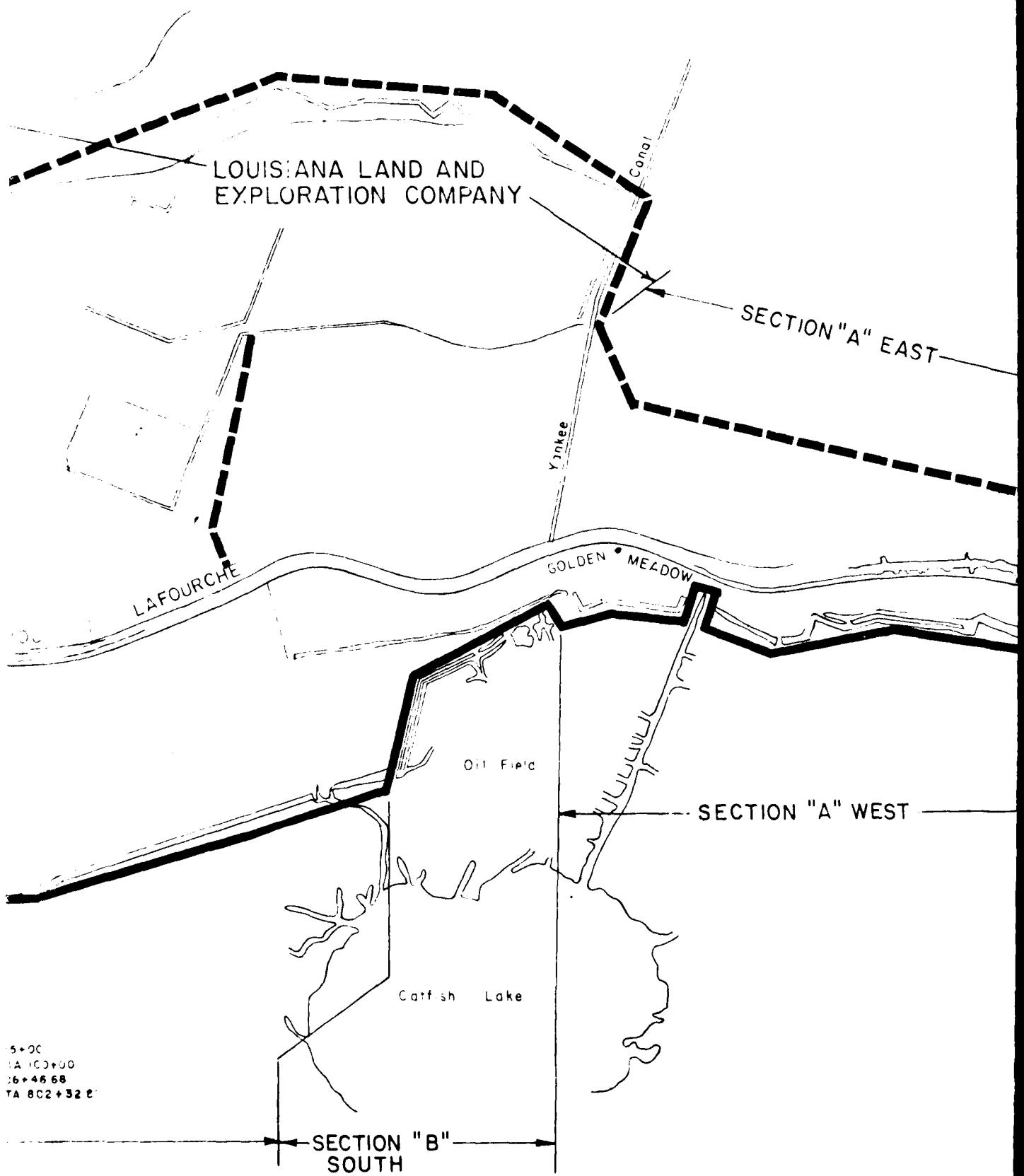
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PLATE 4



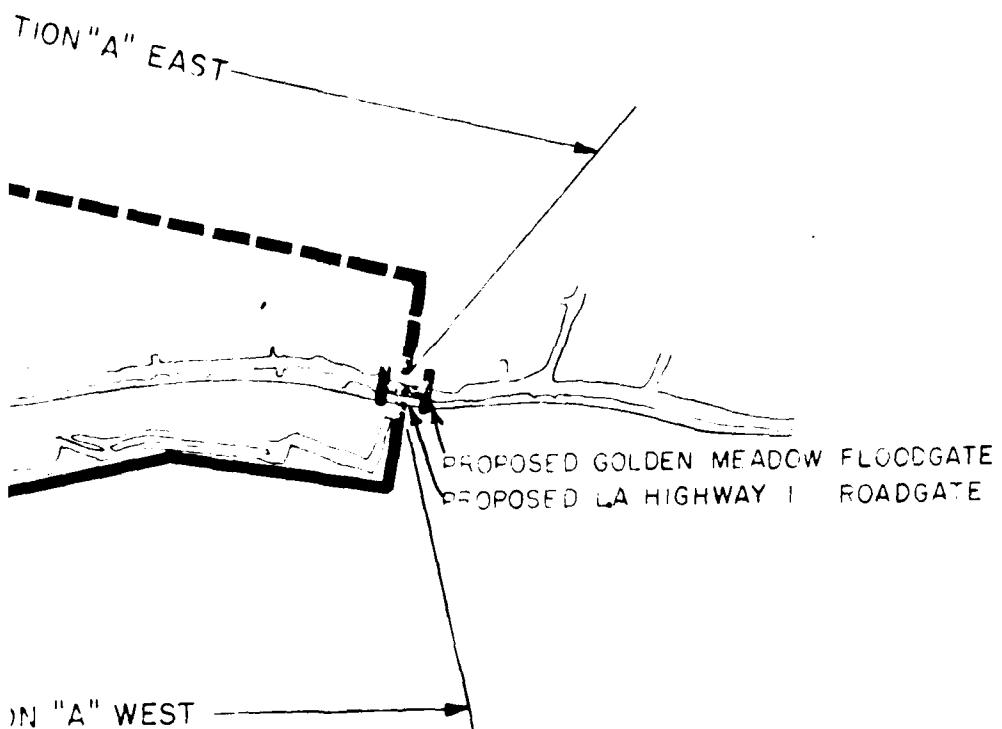






LEGEND

- Existing Levee
- - - Proposed Levee
- Proposed Floodwall
- H Proposed Floodgate



LAKOSE TO GOLDEN MEADOW, LOUISIANA
HURRICANE PROTECTION PROJECT

PLAN 3

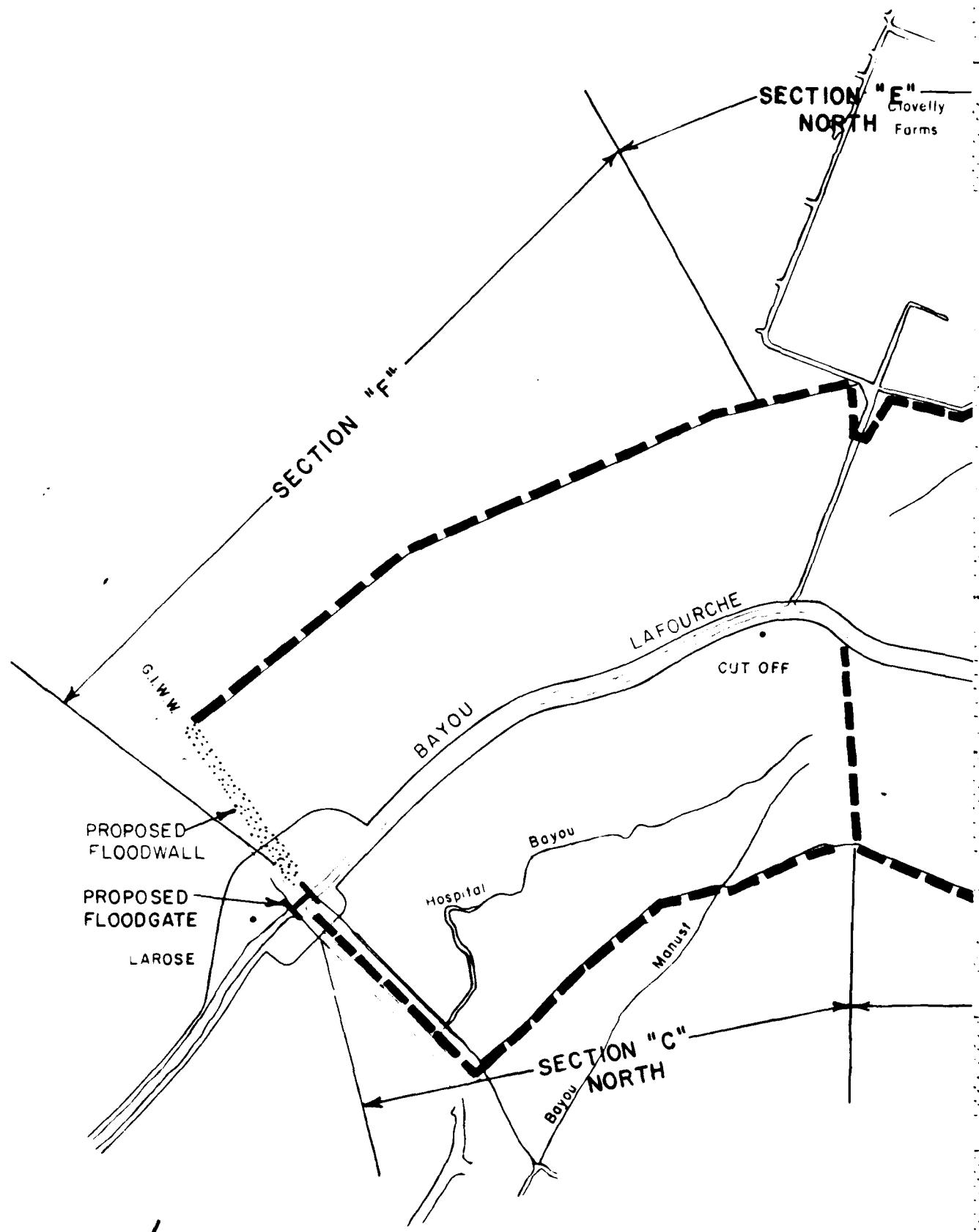
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CORPS OF ENGINEERS

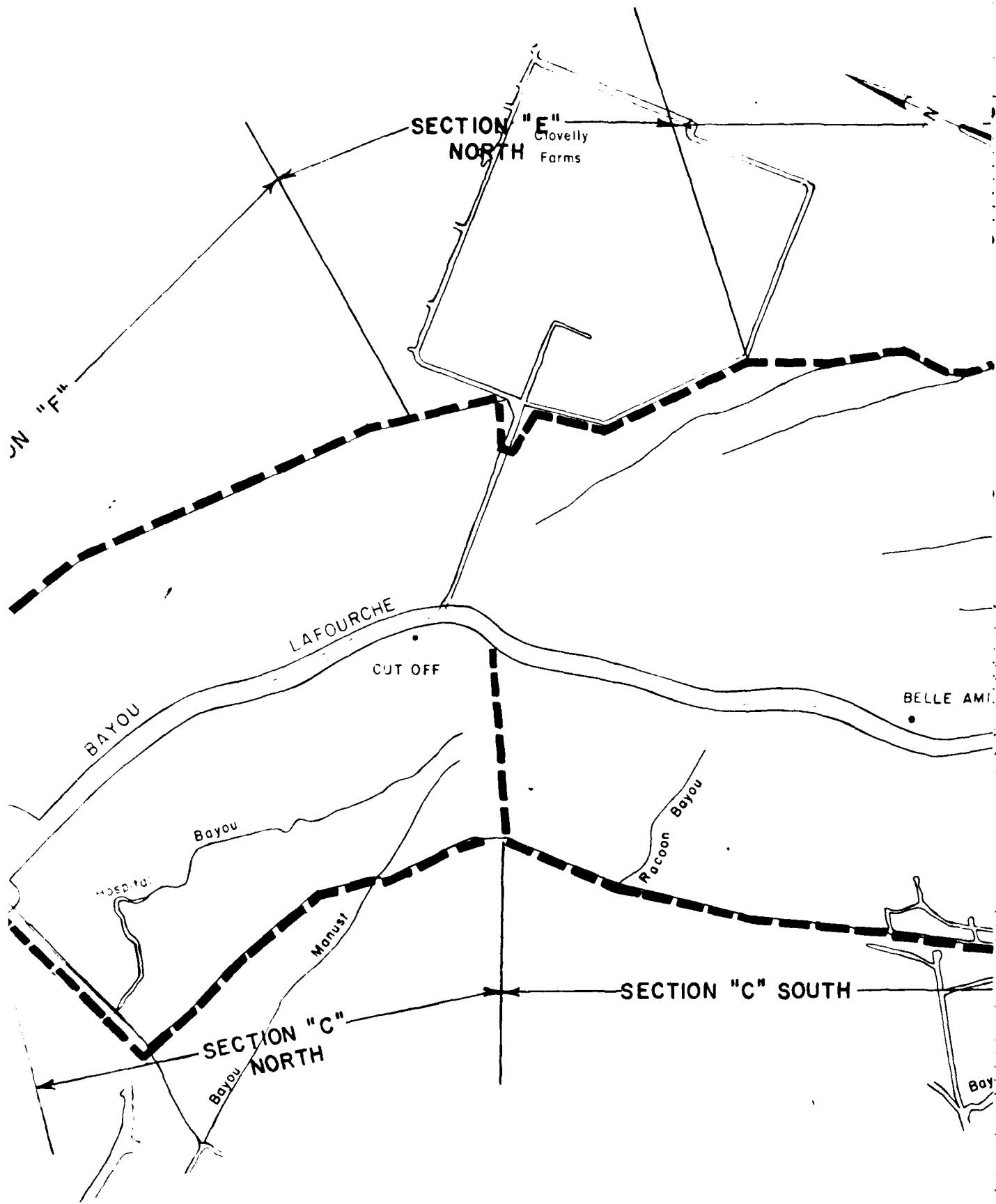
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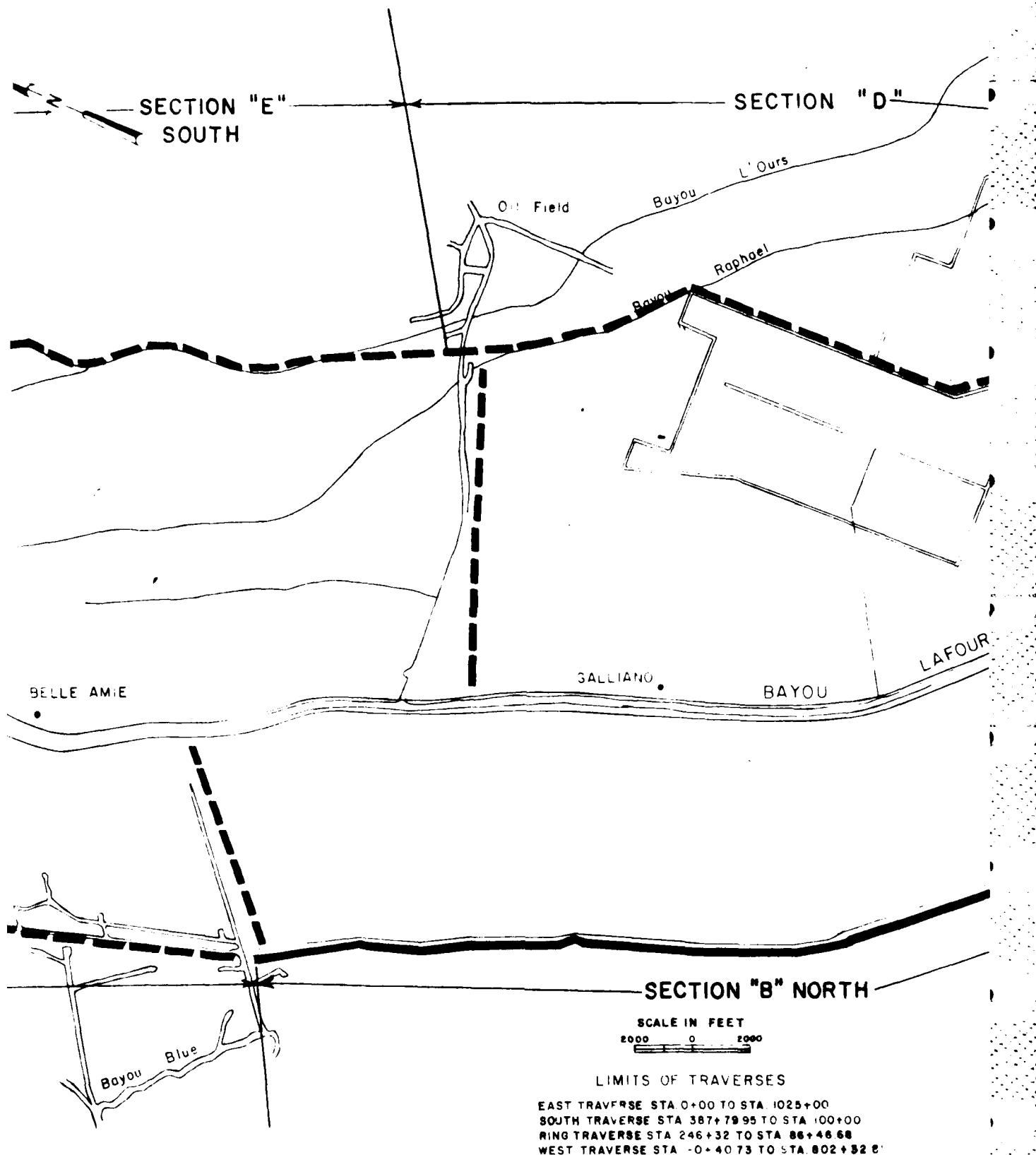
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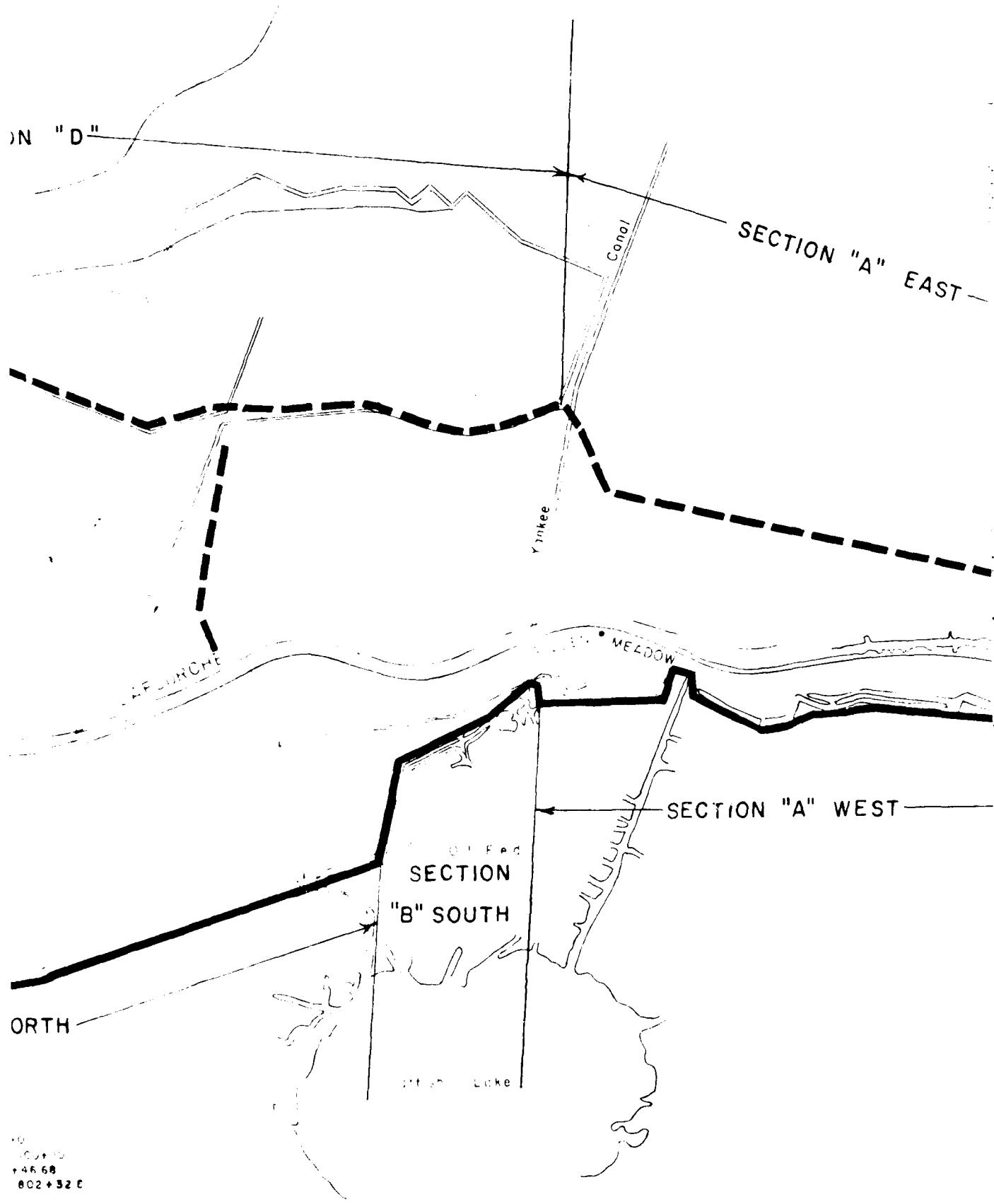
PLATE 5

5







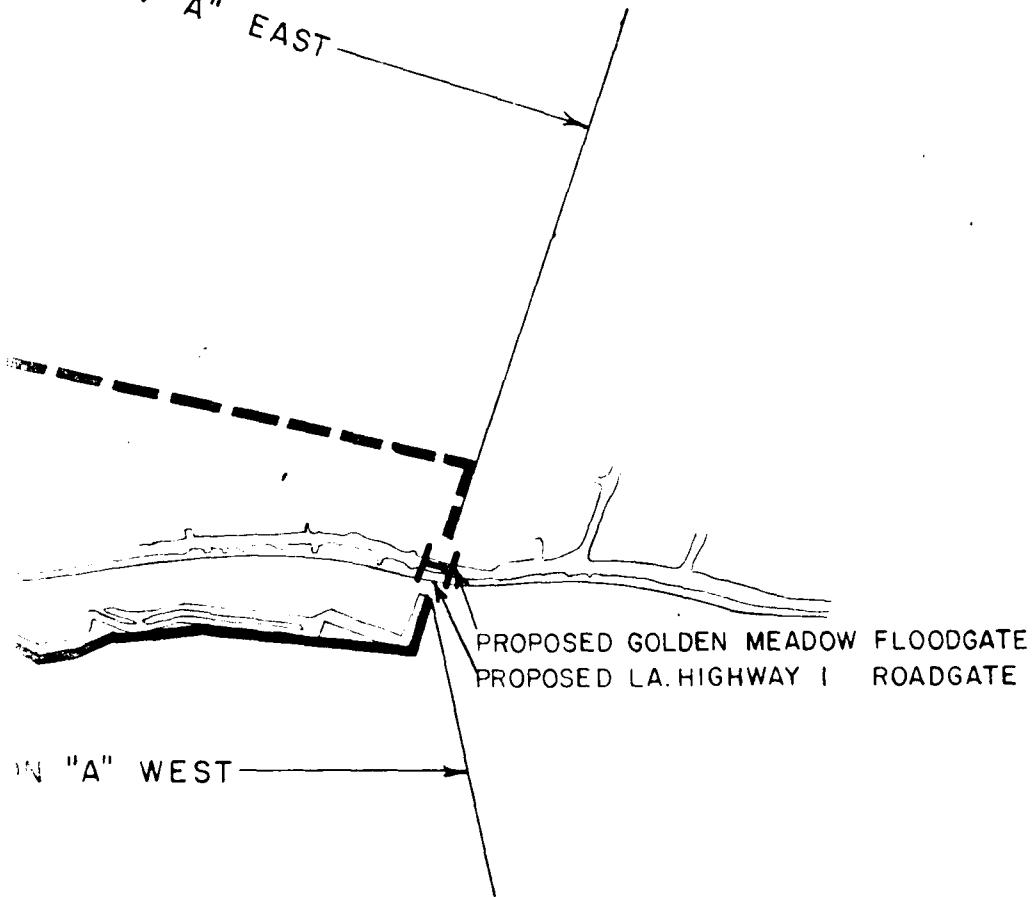


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802 +32 E

LEGEND

- Existing Levee
- - - Proposed Levee
- ||||| Proposed Floodwall
- H Proposed Floodgate

SECTION "A" EAST



IN "A" WEST

LAROSE TO GOLDEN MEADOW, LOUISIANA
HURRICANE PROTECTION PROJECT

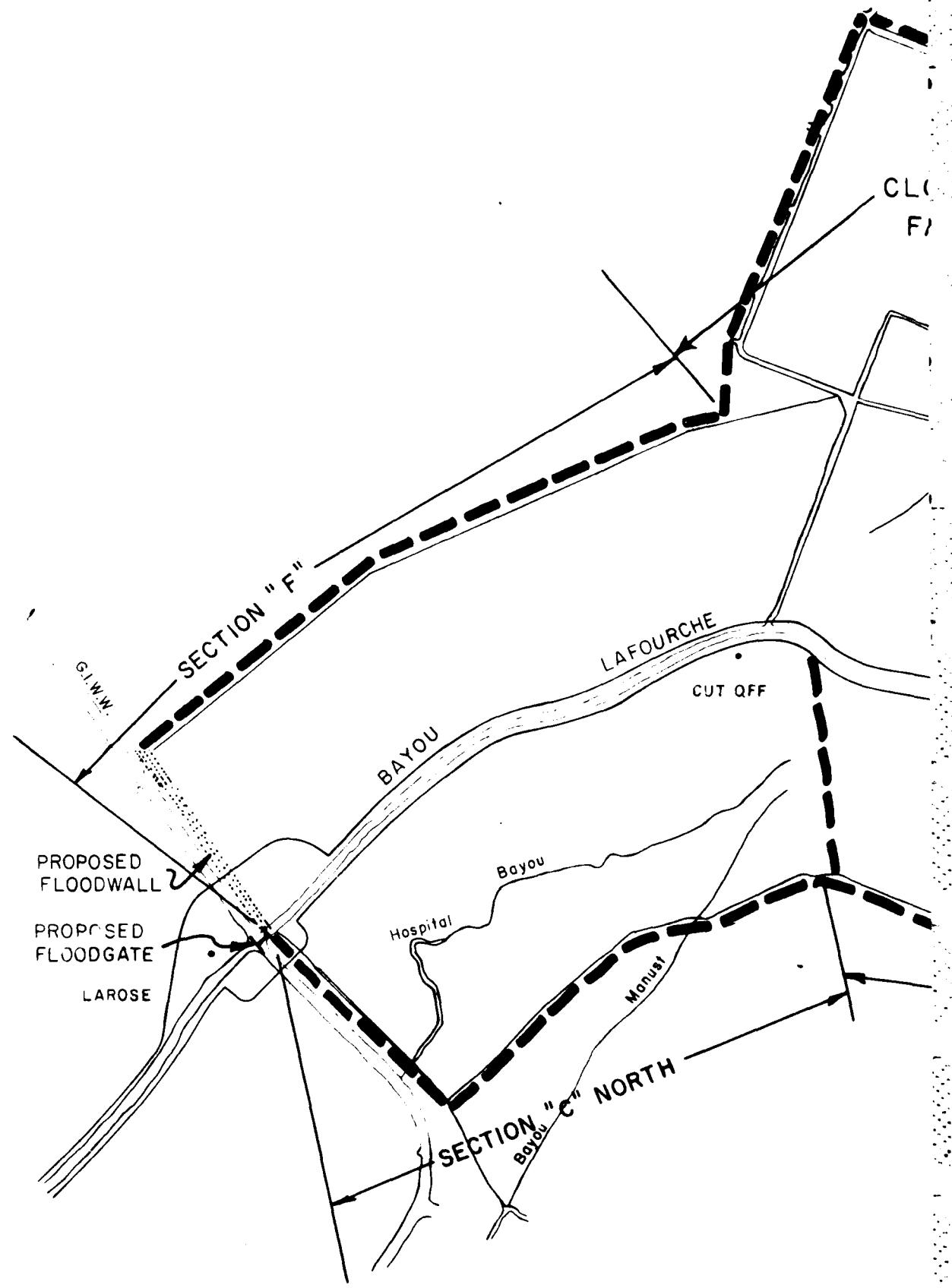
PLAN 4
MODIFIED GDM ALIGNMENT

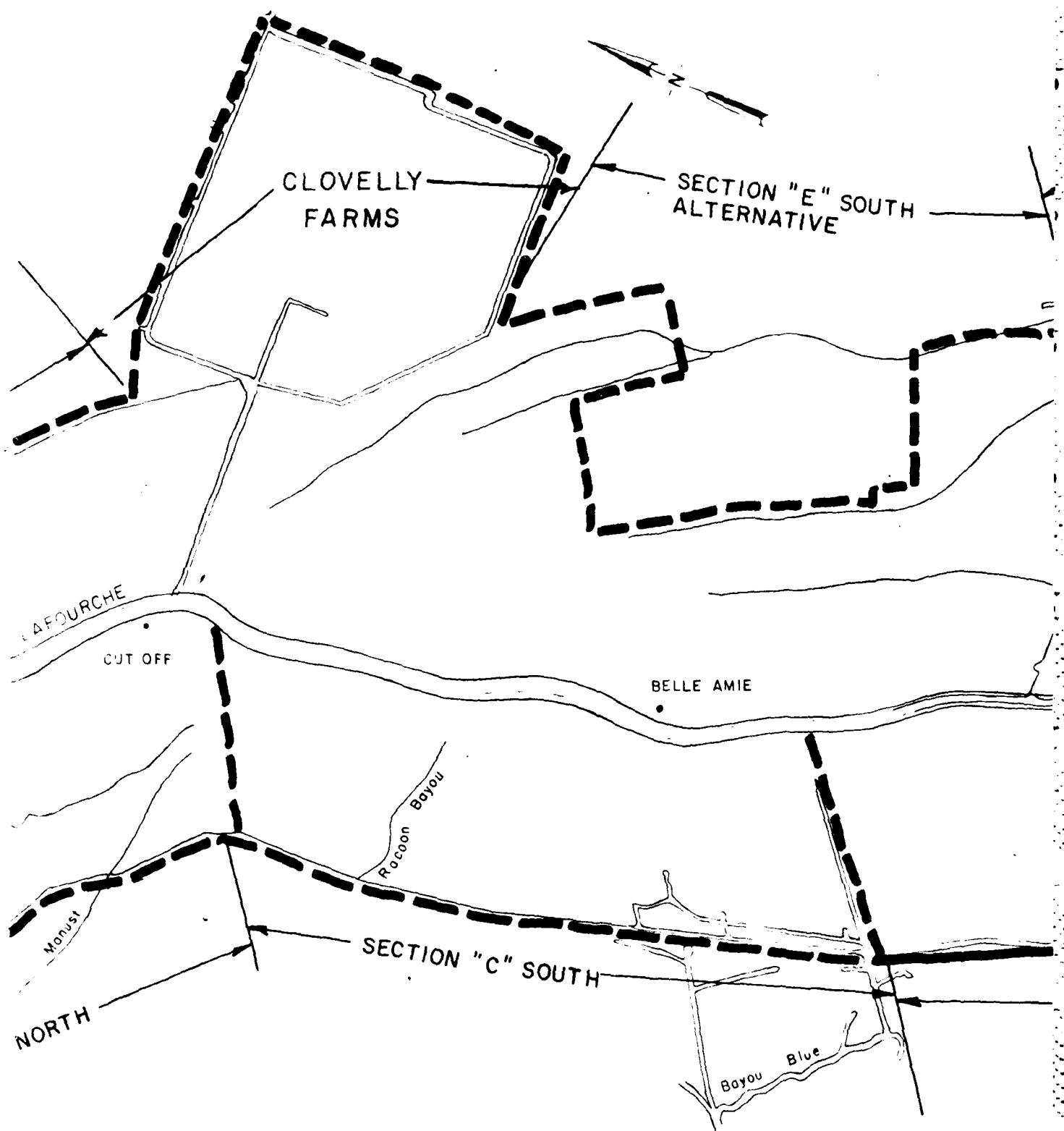
U. S. ARMY EN. NEER. CIVIL EN. NEW ORLEANS
COAST GUARD EN. NEER.

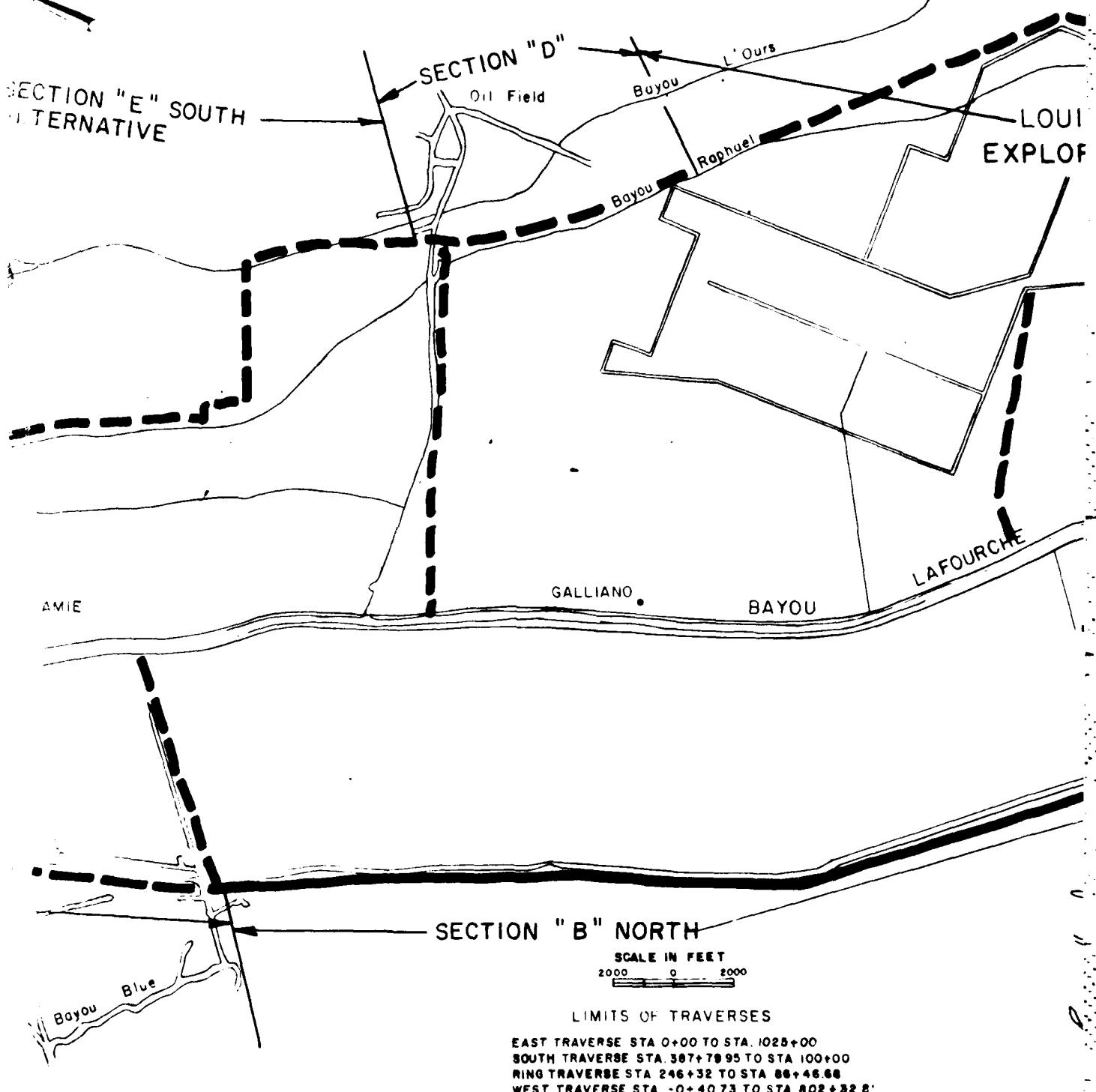
AUGUST 1948

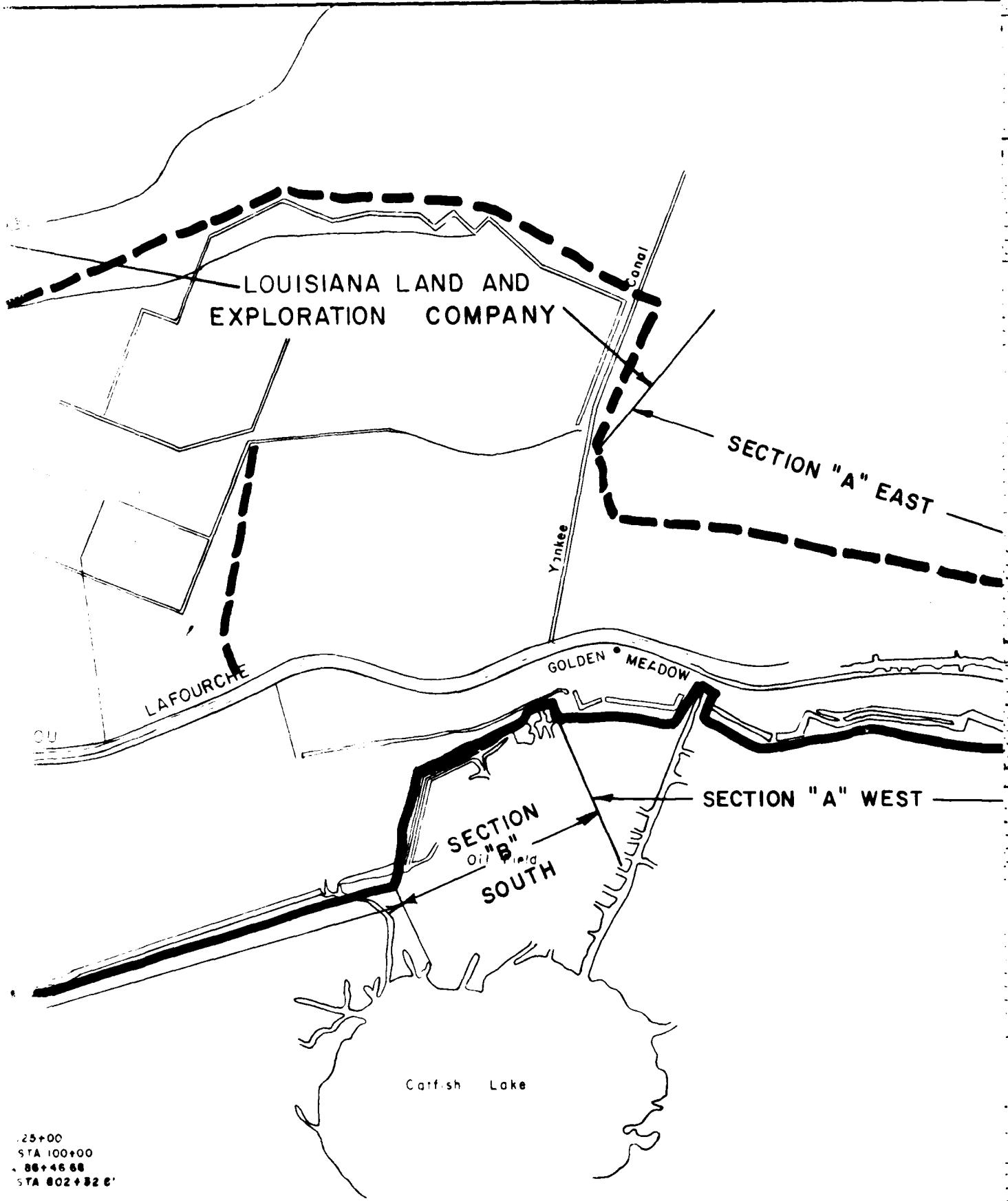
FILE NO. H-2-2949

PLATE 6



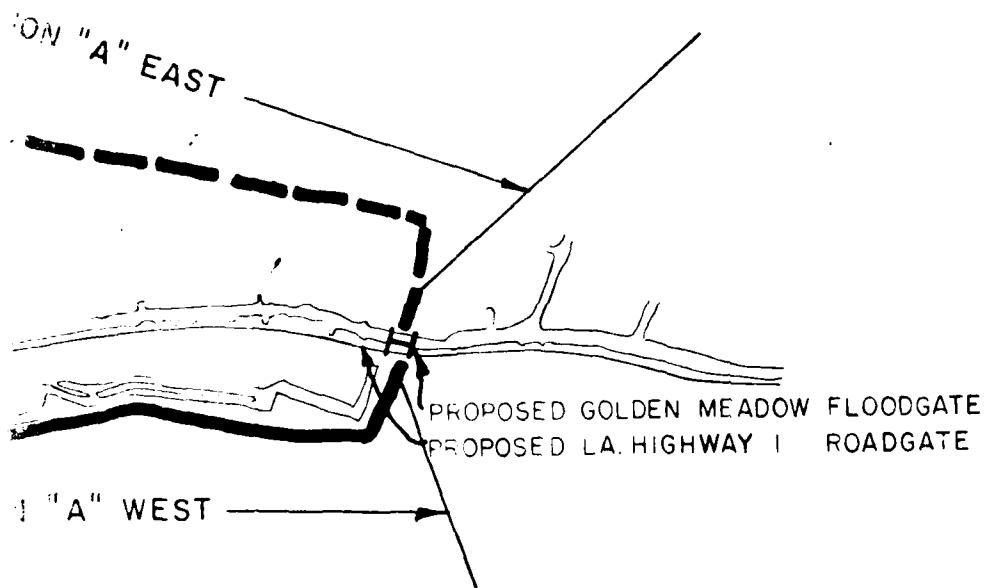






LEGEND

- Existing Levee
- Proposed Levee
- Proposed Floodwall
- H Proposed Floodgate



LAROSE TO GOLDEN MEADOW, LOUISIANA
HURRICANE PROTECTION PROJECT

PLAN 5, "E" SOUTH
ALTERNATE ALINEMENT

U. S. ARMY ENGINEER DISTRICT, NEW ORLEANS
CORPS OF ENGINEERS

AUGUST 1982

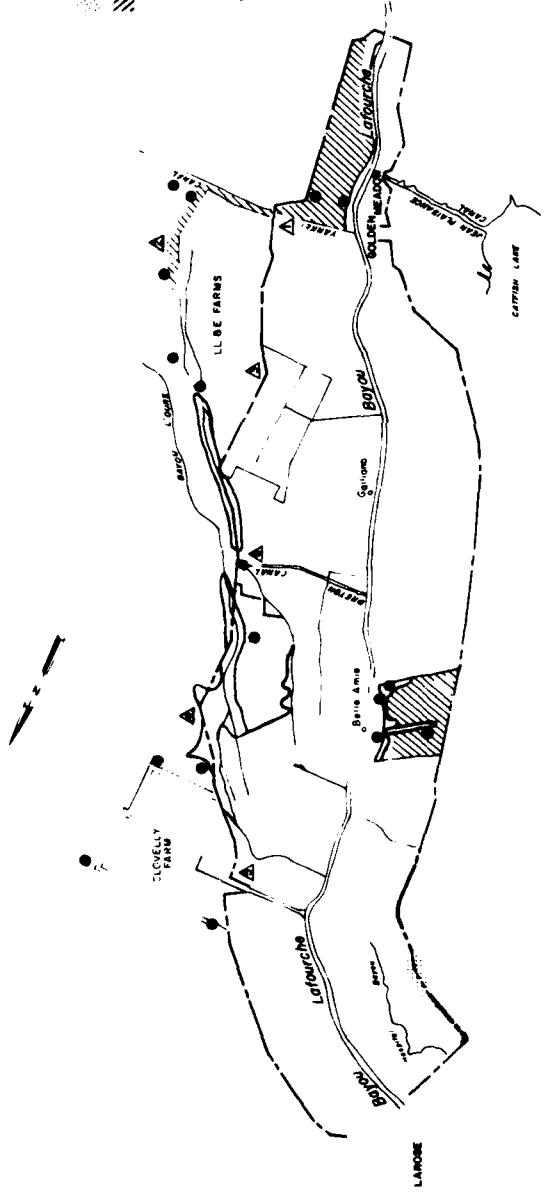
FILE N. H 2-2949

PLATE 7

5

LEGEND

- Fresh and intermediate marsh - open water
- Backish and saline marsh - open water
- Forested wetland
- Habitat Evaluation Procedure sites
- Water Quality Sampling stations



LARGE TO GOLDEN MEADOW, LOUISIANA
HURRICANE PROTECTION PROJECT
WETLAND VEGETATION MAP
U.S. ARMY ENGINEER DISTRICT, NEW ORLEANS
U.S. COAST GUARD COASTAL ENGINES
FILE NO. H-2-29001
AUGUST 1982

PLATE 8

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